43042

Results of...

HYDROGEOLOGIC EVALUATION

for...

Sundstrand Corporation
Rockford, Illinois

August 1989

Project 20557

EDI Engineering & Science
Environmental Engineering, Geology, Biology and Chemistry
a subsidiary of **WW Engineering & Science**
Grand Rapids, Michigan (616) 942-9600 Livonia, Michigan (313) 591-9522

TABLE OF CONTENTS

INTRODUCTION

BACKGROUND

The Sundstrand facility, which is the subject of this report, is located 4747 Harrison Avenue in Rockford, Illinois and was constructed in 1967. The facility produces components for the aerospace industry.

Solvents for cleaning metal products are stored on site in bulk tanks. The solvents currently used include 1,1,1-trichloroethane, Stoddard solvent, tetrachloroethylene, and toluene. Trichloroethylene use was discontinued prior to 1979.

In 1985 a leak was discovered in a tank used to temporarily hold toluene pending its disposal. Sundstrand informed IEPA (Illinois Environmental Protection Agency) of the leak at that time. Subsequent investigation showed that volatile organic compounds existed in ground water at locations not attributable to this toluene leak. Sundstrand also informed the Illinois Environmental Protection Agency of this situation and advised that it would evaluate the extent of ground water contamination.

The toluene loss was evaluated, and a ground water cleanup facility was constructed to remediate this localized problem. This facility consists of two purge wells, an air stripping tower, and related structures. A small portion of the treated effluent was designed to infiltrate back into the ground to flush toluene from the unsaturated soils. The system has been operating successfully since 1986. Reports have been given to the IEPA on a regular basis.

The study summarized in this report deals with an evaluation of ground water quality outside the toluene cleanup area, and an evaluation of the operation of the ground water purge and treatment system. Field work for the hydrogeologic study was initiated in 1986 and completed in February, 1987. A third purge well was constructed, tested, and placed into full-time operation in March 1988 for the purpose of preventing further off-site migration of contaminated ground water. Water from the well is pumped to the existing air stripping tower where the volatile organic compounds are removed. Water is discharged to the Sanitary District of Rockford sewer in accordance with a discharge permit condition. Since March 1988 the combined three-well cleanup system has been successfully operated and monitored.

SCOPE OF INVESTIGATION

The principal objectives of the work described in this report were to determine the extent of on-site ground water contamination, construct a third purge well to remove contaminated ground water outside the toluene cleanup area, and to assess the potential impact on off-site receptors. To accomplish these objectives, the following work was performed:

1. Monitoring wells were installed in the area south and west of the plant in both the bedrock and unconsolidated formations.

2. Water samples were collected from the monitoring wells and analyzed for volatile organic compounds.

3. Water levels were measured and the direction of flow was determined.

4. A pilot well was constructed, and an aquifer test was performed to estimate the yield, effectiveness and quality of water produced at the selected location.

5. The effectiveness of the existing treatment system (air stripping tower) was evaluated to see if the additional flow from a third well could be handled.

6. The pilot well was converted to a third purge well based on the aquifer test results, and the well was connected to the air stripping tower.

7. Ground water and treatment system monitoring was performed to determine the effectiveness of the system.

LOCATION

The Sundstrand facility is located at 4747 Harrison Avenue in the City of Rockford (NE 1/4 Section 5, T43N, R2E, Winnebago County). Commercial and light industrial areas exist to the east and south of the facility. Commercial uses along Alpine and Harrison separate much of the facility from residential areas to the north and west. Figure 1 shows the relationship of the plant to the surrounding areas.

METHODS OF INVESTIGATION

Four monitoring wells were constructed in the western part of the plant property during April, 1986 and are designated MW 27, MW 28, MW 29, and MW 30. An additional six monitoring wells were constructed during November, 1986, and are designated MW 28A, MW 28B, MW 31, MW 31A, MW 32, and MW 32A. The wells with the "A" and "B"

identifications were screened in the glacial drift aquifer, and the other wells were completed as "open holes" in the dolomite bedrock. A bedrock pilot well, designated PW-3, was drilled during February, 1987. This well has been converted to a functioning purge well.

The monitoring wells were drilled using conventional mud and air rotary techniques. Samples of soil and bedrock cuttings were recovered and described on a regular basis during the drilling operation. Appendix A contains well construction records which show specifically how each well was constructed.

The construction technique that was used for all of the bedrock monitoring wells is as follows:

1. Construct an 8 3/4-inch diameter hole through glacial deposits using mud rotary techniques. Log open hole with gamma ray, 0.25-foot normal resistivity, and 2.5-foot normal resistivity logs.

2. Install 6-inch diameter PVC casing with screwed connections from near surface to the top of the bedrock. A 6-inch diameter black steel casing joint was set at the surface to protect the wells from damage (except MW 27 which has a separate protective steel casing).

3. Cement casing from the bottom upward with neat cement.

4. Drill out the cement in the bottom of the well with air rotary after cement set for 48 hours.

5. Air rotary 10-foot open hole in the dolomite with a 5 1/2-inch bit (PW-3 has a 39-foot open hole).

6. Develop well with compressed air until the well was clean of cuttings.

7. Secure well with a locking cap.

Screen settings for the glacial drift wells were based on geologic and geophysical logs. A 6-inch diameter bit and a mud rotary drilling rig was used for the drilling of the glacial drift wells. Each well was completed with 4-foot long, 2-inch diameter stainless steel screen and 2-inch diameter galvanized steel casing. All of the drift wells have 4-inch diameter protective steel casing cemented around above-ground portions of the 2-inch pipe. The wells were backfilled with gravel around the screen, a 3-foot bentonite seal

above the gravel pack, and crushed limestone with drilling mud from the top of the bentonite to the surface.

The drill rods, stabilizers, and bits were steam cleaned after each well. The PVC and black steel casing were also steam cleaned prior to being lowered into the boreholes.

Gamma ray logs were run on existing wells MW 1, MW 14, MW 16, MW 17, MW 18, and MW 20 during April, 1986. These logs can be found in Appendix A.

The elevation of the ground and top of casing for the new monitoring wells was determined using standard instrument surveying techniques. The top-of-casing elevation for MW 20 (elevation 828.19 feet) was used as a benchmark for the survey.

Water levels were measured in the monitoring wells on five occasions. The measurements were made with a steel tape and chalk. These measurements are reported in Table 1 of the text, and several maps have been created from the measurements.

All of the monitoring wells were purged prior to sampling. Approximately three casing volumes of water were removed during the purging. When large volumes of water had to be purged, an electric or gasoline-driven pump was used. Three of the deep bedrock wells (MW 27, MW 28 and MW 29) were purged using an electrical submersible pump because the water levels were below suction lift. Monitor well 17, which had a shallow water level, was purged with a centrifugal pump, and the remaining wells were purged with a stainless steel or Teflon bailer. All wells were sampled with a stainless steel or Teflon bailer. The bailers and pumps were decontaminated before each use by washing with a detergent and thoroughly rinsing, or by steam cleaning. Ground water samples were analyzed by EDI using gas chromotograph/mass spectrometer methods recommended by the U.S. Environmental Protection Agency (EPA Method 624). Results of these analyses are discussed in the section on "Ground Water Quality" and laboratory analytical sheets are contained in Appendix C.

A 24-hour pumping and 16-hour recovery test was performed on pilot well 3 (PW-3) on February 10-11, 1987. A gasoline-driven turbine pump was used to pump the well at 20.8 gallons per minute. A discharge line was run from the pump to the sanitary sewer manhole, with the Sanitary District of Rockford approval, located north of monitoring wells 32 and 32A where a weir was set to measure the flow rate. Water levels were measured in PW-3 and 16 nearby monitoring wells with a steel tape prior to starting the pumping test. These water levels established initial head values prior to the drawdown caused by pumping of PW 3. Water level recorders manufactured by In-Situ, Inc. were lower into monitoring wells 9, 18, 31 and 31A. The water level recorders have pressure

transducers that convert pressure from the head of water above the recorder into feet of head. The four pressure transducers were attached to two Hermit data loggers that stored the water level information during the pumping and recovery portions of the test. Periodic measurements were made with a steel tape in 12 additional monitoring wells. Appendix B contains the measurements made during this test and describes the evaluation procedures.

Five water samples were collected from the pumping well during the aquifer test for analysis of volatile organic compounds.

FINDINGS

GEOLOGY

The glacial sediments which underlie the facility consist of poorly sorted material having a high clay content. These sediments have a low permeability; hence, the rate of ground water migration is expected to be less than one foot per day, based on a permeability of 6 feet per day (silty sand), a gradient of .02 to .006, and a porosity of 0.2.

Gravelly zones exist in the glacial sediments. The locations of cross sections illustrating the general nature of the strata are shown in Figure 2, and the cross sections are shown in Figures 3 and 4.

The thickness of glacial sediments is highly variable on site, ranging from 10 to 20 feet near the plant to 140 feet at the southwestern property corner. The irregular bedrock surface is illustrated in Figure 5.

In general, a fractured zone at the top of the dolomite bedrock is expected; however, none of the exploration holes constructed for this study encountered such zones. The available information shows that bedrock fractures do not seem to play an important role in the local hydrogeology.

The area between 2 miles west of the plant and four miles west of the plant is geologically different than the area within 2 miles of the plant. The ancestral Rock River carved a deep valley in the bedrock, removed the dolomite strata, and exposed the St. Peter Sandstone. Ultimately, the river deposited sand and gravel in the valley. This relationship is illustrated conceptually by Figure 6 which was adapted from information contained in a report dated 1979 by Stanley Consultants for the City of Rockford.

AQUIFER TEST RESULTS

Water levels monitored in wells MW 9 and MW 31 during the test of the pilot well (called PW-3) resulted in drawdown data that could be analyzed by the method described by Boulton (Kruse and De Rider, 1970, p. 97). These two monitoring wells and the pilot well tap the upper portion of the dolomite bedrock formation. The analytical method is applicable for a pumping situation where steady-state flow conditions have not been attained and vertical ground water movement from overlying beds influences the water levels. The curve matching technique resulted in a calculated transmissivity of 600 ft^2/day using data from well 9 and 900 ft^2/day using data from well 31.

The cone of depression resulting from pumping purge well 1 was evaluated by the method described by Lohman (1972, p. 46). The pumping rate of PW 1 was 19.6 gpm when the water levels were measured in September, 1986. The closed contour method resulted in a transmissivity estimate of about 500 ft^2/day.

For the purpose of this report, a transmissivity of 650 ft^2/day will be used as representative of the dolomite aquifer. This value is close to the average of the three calculations.

Previous estimates of hydraulic conductivity from "slug-test" data of monitoring wells which tap the dolomite ranges from 0.04 ft/day to 20.7 ft/day with an average of 3.28 ft/day. The dolomite aquifer is at least 100 feet thick at the Sundstrand facility; hence, the aquifer tests described above would result in a K value of 6.5 ft/day or less (hydraulic conductivity is transmissivity divided by aquifer thickness).

These low hydraulic conductivity values mean that ground water movement is slow. At the western property line the average ground water velocity is estimated to be 0.39 foot per day, or less than about 150 feet per year. This estimate is based on the following equation as described in Lohman (1972, p. 10):

$$v = \frac{Ki}{p}$$

where:

- v = average velocity in feet per day
- K = hydraulic conductivity in feet per day (6.5 ft/day)
- i = pre-pumping ground water gradient (0.012 ft/ft)
- p = effective porosity (20%)

GROUND WATER FLOW

Both the sand and gravel found to the west near the river and the St. Peter Sandstone are aquifers in this region. Near the facility, and regionally, the glacial sediments and the dolomite bedrock (Galena-Platteville) have low permeability and have poor water-yielding ability compared to the St. Peter Sandstone or the sand and gravel aquifer. The St. Peter Sandstone is about 150 feet below the surface.

The water table is relatively shallow on-site, ranging from less than 10 feet to almost 50 feet below ground. In some areas, where the glacial sediments are thin, the water table lies below the top of bedrock. Water level measurements are shown in Table 1.

The flow pattern of ground water in the glacial sediments is similar to the flow pattern of ground water in the bedrock as shown in Figures 7 and 8. The direction of flow is southwestward in the northeastern portion of the property and westward along the western property line. However, the water level measurements in wells tapping the glacial sediments show a complex flow pattern suggesting poor hydraulic connections between various glacial strata. This means that the flow in the unconsolidated sediments is impeded because of the heterogeneous nature of the formation.

Purge wells PW-1 and PW-2 have significantly altered the pre-pumping ground water flow pattern in the bedrock. These wells pump a combined total of about 25 gpm (gallons per minute) and, as shown in Figure 8, have created a cone of depression which results in capturing ground water below most of the eastern portion of the plant building. Purge well 3 (PW-3) is not as hydraulically effective as PW-1 and PW-2, and PW-3 has not created as large a cone of depression. PW-3 is currently being pumped at a long-term average rate of 8.2 gpm and intercepts ground water from a large area due to the natural convergence of flow lines toward the well and the cone of depression the well creates. Hence, it is projected, as shown in Figure 8, that the three purge wells will capture all or almost all of the ground water below, south, and east of the manufacturing building. Work is underway to increase the pumping rate of PW 3.

Ground water in either the glacial sediments or the bedrock could, among other receptors, possibly discharge to the Rock River (4 miles west) or be intercepted by municipal wells (2.5 miles west). Any receptor would take many years to reach at a calculated flow rate of less than one-half foot per day. It should be noted that contaminants in the ground water will move considerably slower than the ground water due to adsorption and other physical/chemical reactions. There is also the possibility that the constituents could degrade and therefore never arrive at a receptor. The intermittent stream found west of

TABLE 1. SUMMARY OF GROUND WATER LEVEL MEASUREMENTS.

WELL NUMBER	AQUIFER	T.O.C. ELEV.	WELL DEPTH	4/23/85 DEPTH TO WATER	4/15/86 DEPTH TO WATER	11/19/86 DEPTH TO WATER	3/15/89 DEPTH TO WATER	3/27/89 DEPTH TO WATER	4/23/85 ELEV. OF WATER	4/15/86 ELEV. OF WATER	11/19/86 ELEV. OF WATER	3/15/89 ELEV. OF WATER	3/27/89 ELEV. OF WATER
MW-3	D	845.68	12	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
MW-2	B	845.65	42	32.61	34.82	34.84	39.07	39.03	813.04	810.83	810.81	806.58	806.62
MW-5	B	845.80	65	35.89	40.07	40.69	45.22	45.25	809.91	805.73	805.11	800.58	800.55
MW-1	B	845.67	127	38.01	39.65	39.33	48.48	48.61	807.66	806.02	806.34	797.19	797.06
MW-4A	B	845.62	38	(3)	30.02	29.48	31.68	31.65	(3)	815.60	816.14	813.94	813.97
MW-6	B	845.70	38	26.88	27.71	27.35	36.82	36.89	818.82	817.99	818.35	808.88	808.81
MW-7	D	834.25	31	25.36	27.07	26.48	28.09	28.14	808.89	807.18	807.77	806.16	806.11
MW-9	B	834.38	53	35.06	35.15	35.22	41.56	42.05	799.32	799.23	799.16	792.82	792.33
MW-10	B	834.68	151	34.28	34.49	34.61	41.25	41.92	800.40	800.19	800.07	793.43	792.76
MW-8	D	820.55	19	10.20	10.30	9.84	10.21	11.30	810.35	810.25	810.71	810.34	809.25
MW-17	B	819.95	152	12.84	13.15	13.24	20.66	20.81	807.11	806.80	806.71	799.29	799.14
MW-11	D	843.32	39	27.17	37.41	37.73	DRY	DRY	816.15	805.91	805.59	DRY	DRY
MW-10	B	843.38	87	36.41	37.15	37.43	45.20	45.29	806.97	806.23	805.95	798.18	798.09
MW-16	B	843.23	201	36.34	36.68	36.76	45.37	45.47	806.89	806.55	806.47	797.86	797.76
MW-12	B	854.72	31	30.94	30.16	31.52	(1)	(1)	823.78	824.56	823.20	(1)	(1)
MW-13	B	854.76	66	35.53	35.51	36.36	(1)	(1)	819.23	819.25	818.40	(1)	(1)
MW-14	B	854.73	101	35.78	35.95	36.74	(1)	(1)	818.95	818.78	817.99	(1)	(1)
MW-15	B	845.46	50	35.77	38.99	39.40	44.96	44.89	809.69	806.47	806.06	800.50	800.57
MW-19	D	828.14	40	29.74	29.70	29.64	35.12	35.22	798.40	798.44	798.50	793.02	792.92
MW-29	B	827.81	113	(3)	28.17	28.26	34.87	35.13	(3)	799.64	799.55	792.94	792.68
MW-20	B	826.19	145	26.35	26.38	26.47	35.11	35.35	799.84	799.81	799.72	793.08	792.84
MW-30	B	841.62	39	(3)	37.38	35.47	DRY	DRY	(3)	804.24	806.15	DRY	DRY
MW-21	D	825.87	76	25.52	25.70	25.77	31.99	32.18	800.35	800.17	800.10	793.88	793.69
MW-22	B	825.44	145	26.42	26.61	26.65	32.64	32.84	799.02	798.83	798.79	792.80	792.60
MW-31A	B	835.99	45	(3)	(3)	36.61	43.09	43.30	(3)	(3)	799.38	792.90	792.69
MW-31	B	834.94	65	(3)	(3)	35.38	41.68	42.08	(3)	(3)	799.56	793.26	792.86
MW-23	B	844.51	64	(3)	37.16	37.48	(2)	44.61	(3)	807.35	807.03	(2)	799.90
MW-24	B	844.36	74	(3)	40.85	40.60	47.11	47.10	(3)	803.53	803.78	797.27	797.28
MW-25	B	844.11	138	(3)	39.58	40.04	48.55	48.75	(3)	804.53	804.07	795.56	795.36

TABLE 1. SUMMARY OF GROUND WATER LEVEL MEASUREMENTS (continued).

WELL NUMBER	AQUIFER	T.O.C. ELEV.	WELL DEPTH	4/23/85 DEPTH TO WATER	4/15/86 DEPTH TO WATER	11/19/86 DEPTH TO WATER	3/15/89 DEPTH TO WATER	3/27/89 DEPTH TO WATER	4/23/85 ELEV. OF WATER	4/15/86 ELEV. OF WATER	11/19/86 ELEV. OF WATER	3/15/89 ELEV. OF WATER	3/27/89 ELEV. OF WATER
MW-26	B	846.00	95	(3)	40.79	41.20	49.36	49.41	(3)	805.21	804.80	796.64	796.59
MW-27	B	854.21	73	(3)	25.36	25.16	34.18	34.06	(3)	806.85	809.05	800.03	800.15
MW-28A	D	830.69	65	(3)	(3)	27.81	34.52	32.66	(3)	(3)	802.88	796.17	798.03
MW-28B	D	830.59	85	(3)	(3)	27.41	34.18	32.34	(3)	(3)	803.18	796.41	798.25
MW-28	B	830.35	107	(3)	26.70	26.70	33.86	34.02	(3)	803.65	803.65	796.49	796.33
MW-32A	D	844.61	48	(3)	(3)	41.08	DRY	48.20	(3)	(3)	803.53	DRY	796.41
MW-32	B	844.77	66	(3)	(3)	41.31	45.28	48.39	(3)	(3)	803.46	799.49	796.36

T.O.C. REFERS TO "TOP OF CASING".

"D" REFERS TO A DRIFT AQUIFER AND "B" REFERS TO BEDROCK.

(1) THESE WELLS WERE ABANDONED DUE TO BUILDING CONSTRUCTION.

(2) OBSTRUCTION IN WELL.

(3) WELL DID NOT EXIST ON THIS DATE.

the plant is not expected to be a significant discharge zone. This interpretation is based on the stream's elevation compared to local ground water level contours.

GROUND WATER QUALITY

Ground water having the highest volatile organic compounds concentrations in the bedrock and glacial drift seem to be restricted to the area south of the main plant and north of "Plant 8". The area extends westward from the toluene recovery facility (near PW-1 and PW-2), where VOC concentrations are highest, to the west property line where they are the lowest. This area is shown in Figure 9, and the analyses for VOC's are summarized in Table 2 and 4. The inorganic water quality analyses for eight wells are shown in Table 3. This information shows that the water is typical with respect to the inorganic quality.

The upper portion of the bedrock formation is, with certain exceptions, the zone through which the volatile organic compounds are migrating. Table 2 shows that the monitoring wells tapping zones near the top of the bedrock generally have higher concentrations of volatile organic compounds than more shallow or deeper wells. Purge wells PW-1, PW-2, and PW-3 withdraw water from this same zone.

Table 4 summarizes the results of analysis of purge well samples during the past year. These results, plus the monitoring well sample results (Table 2) show that 1,1,1-trichloroethane is the best indicator compound for contaminants on site.

MIGRATION AND CAPTURE OF CONTAMINANTS

As described above, the ground water contaminants are confined to a relatively narrow band which extends westward from the plant area toward PW-3 and monitoring well cluster 7, 9 and 18. The migration rate of those contaminants that have not degraded is slow due to the low formation permeability coupled with the retardation of organic compounds caused by adsorption. Contaminant velocity is expected to be slower than the ground water velocity which is calculated to be 0.39 foot per day because of the small particle size of the material which makes up the drift or bedrock aquifer and the natural tendency of chlorinated hydrocarbon to adsorb on aquifer material.

Purge well 3 was strategically located to capture contaminated ground water before the contaminants migrate off-site. Operation of this well for the past year shows that the well is capturing contaminants. The average pumping rate during the previous year has been 8.2 gallons per minute and an approximate average volatile organic compound concentration has been about 300 micrograms per liter. Because of the low formation

TABLE 2

SUMMARY OF VOLATILE ORGANIC COMPOUND ANALYSIS OF MONITORING WELL SAMPLES
(results in ug/l)

Well No.	Well Depth (ft)	Formation	Bedrock Depth (ft)	Date Sampled	Benzene,	1,1-DCA	1,2-DCA	1,1-DCE	Trans-1,2-DCE	PCE	1,1,1-TCA	TCE	Other Compounds
6	38	Bedrock	13	04-17-86	-	-	-	45	-	98	270	29	
12	31	Bedrock	22	04-18-86	-	-	-	-	-	-	-	-	
13	66	Bedrock	22	04-18-86	2	-	-	-	-	-	-		
14	101	Bedrock	22	04-18-86	-	-	-	-	-	-	-	-	
11	40	Drift		11-13-86	-	-	-	11	-	6	130	6	
10	87	Bedrock	77	04-17-86	1	6	3	330	9	140	2,100	160	TCFM[1]: 4
				11-13-86	-	6	3	310	8	120	1,600	130	Toluene: 1
				03-16-89							180		
16	201	Bedrock	77	04-17-86	1	-	-	-	-	-	-	-	
				11-14-86	-	-	-	-	-	-	-	-	
8	19	Drift		04-17-86	-	-	-	-	-	-	-	15	
17	154	Bedrock	133	04-17-86	-	-	-	-	-	-	-	-	
28A	65	Drift		11-18-86	-	-	-	2	-	-	48	-	
				03-16-89							26		
28B	85	Drift		11-18-86	-	-	-	-	-	-	-	-	
28	107	Bedrock	91	04-17-86	-	-	-	-	-	-	-	-	
				11-17-86	-	-	-	-	-	-	-	-	
21	76	Drift		04-17-86	-	9	-	-	-	-	24	-	
				11-14-86	-	13	-	2	3	-	31	-	Chloroethane: 11
				03-16-89							20		
22	146	Bedrock	137	04-17-86	-	-	-	-	-	-	-	-	
				11-14-86	-	-	-	-	-	-	-	-	
22(dup)[2]				11-14-86	-	-	-	-	-	-	-	-	
31A	45	Drift		11-20-86	-	-	-	3	-	2	49	-	
31A(dup)[2]				11-20-86	-	-	-	3	-	2	48	-	
				03-15-89							57		
31	65	Bedrock	47	11-20-86	-	-	-	-	-	-	19	-	
				03-15-89							18		

gg c:\Sndstrnd

TABLE 2

SUMMARY OF VOLATILE ORGANIC COMPOUND ANALYSIS OF MONITORING WELL SAMPLES
(results in ug/l)
(Continued)

Well No.	Well Depth (ft)	Formation	Bedrock Depth (ft)	Date Sampled	Benzene,	1,1-DCA	1,2-DCA	1,1-DCE	Trans-1,2-DCE	PCE	1,1,1-TCA	TCE	Other Compounds
7	30	Drift		04-17-86	-	-	-	-	-	-	-	-	
				11-12-86	-	-	-	-	-	-	-	-	
9	52	Bedrock	42	04-17-86	-	2	-	49	2	23	360	38	
				11-12-86	-	8	4	200	8	100	1,400	140	
18	151	Bedrock	42	04-17-86	-	-	-	-	-	-	-	-	
				11-12-86	-	-	-	-	-	-	-	-	
32A	48	Drift		11-21-86	-	-	-	110	-	140	970	100	
32	66	Bedrock	50	11-21-86	-	-	-	13	17	270	3,000	590	
				03-16-89							1,500		
30	39	Bedrock	20	04-17-86	-	-	-	-	-	-	-	-	
				11-12-86	-	-	-	-	-	-	-	-	
19	40	Drift		04-17-86	2	-	-	-	-	-	-	-	Chloroform: 1
				11-12-86	-	-	-	-	-	-	-	-	
29	113	Bedrock	100	03-16-89		-	-	-	-	-	-	-	
				04-17-86	1	-	-	-	-	-	-	-	
				11-17-86	-	-	-	-	-	-	-	-	
20	147	Bedrock	100	03-16-89		-	-	-	-	-	-	-	
				04-17-86	1	-	-	-	-	-	-	-	
				11-17-86	-	-	-	-	-	-	1.7	-	
				03-16-89		-	-	-	-	-	2	-	
27	83	Bedrock	69	04-17-86	-	-	-	-	-	-	7	-	
											4.9		

---

1 Trichlorofluoromethane
2 Duplicate
A dash indicates "not detected".
A blank indicates the sample was not analyzed for the indicated compound.

TABLE 3

SUMMARY OF INORGANIC WATER QUALITY ANALYSIS
(results in Mg/l)

Well No.	Well Depth (ft)	Formation	Bedrock Depth (ft)	Date Sampled	Bicarbonate	Chloride	Hardness (as CaCO2)	Grease & Oil	TDS[1]	pH[2]	Sulfate	TOC[3]
6	38	Bedrock	13	04-17-86	230	27	350	1.7	370	7.96	61	LT 5
9	52	Bedrock	42	04-17-86	150	16	220	1.7	250	8.46	39	LT 5
14	101	Bedrock	22	04-18-86	170	106	280	1.5	430	8.49	38	LT 5
16	201	Bedrock	77	04-17-86	290	6.1	360	1.8	340	7.74	25	LT 5
17	154	Bedrock	133	04-17-86	320	5.2	390	1.7	400	7.63	67	LT 5
21	76	Drift		04-17-86	170	15	240	1.9	280	8.50	67	LT 5
27	83	Bedrock	69	04-17-86	360	130	530	1.5	780	7.49	56	LT 5
30	39	Bedrock	20	04-17-86	24	32	69	2.4	470	10.93	38	LT 5

---

1 Total dissolved solids.
2 pH is reported in standard units.
3 Total organic carbon.
LT Means "less than" the amount shown

gg c:\Sndstrnd

TABLE 4

SUMMARY OF VOLATILE ORGANIC COMPOUND ANALYSES OF PURGE WELL SAMPLES
(results in ug/l)

WELL NO.	DATE	1,2-DCE	PCE	TOLUENE	1,1,1-TCA	TCE
PW-1	04-28-88	nd	220	65	2,900	335
	07-12-88	nd	240	150	2,250	310
	08-17-88	nd	nd	250	2,350	320
	10-18-88	nd	190	nd	1,300	300
	12-13-89	nd	220	nd	2,000	240
	01-26-89	nd	210	180	2,360	250
PW-2	04-28-88	nd	nd	45,500	29,500	nd
	07-12-88	nd	nd	76,500	38,500	nd
	08-17-88	nd	nd	nd	2,850	nd
	10-18-88	nd	2,300	21,000	11,000	2,800
	12-13-89	nd	120	130	nd	120
	01-26-89	nd	220	nd	3,020	nd
PW-3	02-10-87(1)	nd	8	t	111	11
	04-28-88	nd	13	nd	114	19
	07-12-88	nd	85	585	880	110
	08-17-88	nd	nd	nd	210	nd
	10-18-88	nd	nd	nd	110	nd
	12-13-89	nd	13	nd	87	12
	01-26-89	nd	28	nd	280	nd

---

1 Reported results for this date represent the average of 5 samples collected during pumping test. These samples preceeded use of this well as a purge well.

nd not detected

t trace (see Appendix C)

permeability and subsequent low well pumping rate, together with the horizontal extent of the contamination, PW-3 cannot capture all of the contaminants at the property line, and it cannot pull back contaminants that have migrated beyond the property line.

WATER USE

Records of potable water wells from the Illinois Geological Survey show that about 300 wells were constructed prior to 1980 in the area west of the plant and east of the Rock River. According to the City of Rockford water department records in 1987, all of the water users within 1 1/4 mile directly west of the Sundstrand facility now rely upon the City of Rockford for potable water. Water use patterns near the facility are shown in Figure 10. Currently, some homeowners more than 1 1/4 mile west of the plant continue to use individual wells even though city water is available. It is unlikely that contaminants, as they leave the facility property, will reach these receptors because of the very low ground water velocity and even slower contaminant velocity, coupled with natural degradation, dispersion, and dilution of the contaminants as they move downgradient.

SUMMARY AND CONCLUSIONS

The plant is underlain by poorly sorted glacial drift sediments having poor water transmitting characteristics. Dolomite underlies the glacial drift and the dolomite surface varies considerably in elevation. Both the glacial drift and the dolomite bedrock have poor water transmitting characteristics.

Ground water is found at depths ranging from 10 to 50 feet on site. Water in both the glacial drift and the dolomite flows predominantly toward the west. The rate of ground water migration is estimated to be 0.38 foot per day. The migration rate of those contaminants that have not degraded is even slower due to adsorption.

The principal volatile organic compound found in ground water is 1,1,1-trichloroethane. Ground water having the highest volatile organic compound concentrations in the bedrock and glacial drift seem to be restricted to the area south of the main plant and north of Plant 8. The area extends westward from the toluene recovery facility where VOC concentrations are highest, to the west property line where concentrations are lowest. The migration pathway seems to be along a zone close to the top of the bedrock.

The three purge wells have created a substantial change in ground water flow patterns within the bedrock near the plant. Evaluation of the cone of depression created by this pumpage shows that the dolomite has a low water yielding capability with an average

transmissivity of 650 feet^2 per day. Because of this, individual purge well pumping rates are less than 20 gallons per minute. Purge well 3 has been pumping at a rate of 8.2 gallons per minute for the past year, and this well has not created as large a cone of depression as wells 1 and 2.

PW-3 was strategically placed to intercept contaminants moving toward the western facility boundary and this well has been successfully operating since March 1988. However, PW-3 will not capture all of the contaminants before they move off-site and it will not pull back contaminants that have already moved off-site. It is unlikely that contaminants in the ground water, as they leave the facility, will reach receptors. This is because of the very low contaminant velocity coupled with natural degradation, dispersion, and dilution of the contaminates as they move downgradient.

RECOMMENDATIONS

1. A soil vapor survey should be performed to aid in selecting the number and locations of the monitoring wells recommended below.

2. A boring and monitoring well should be installed between well clusters 31-31A and 21-22 to evaluate the possibility that an avenue for contaminant migration may exist there as implied by the glacial drift water level map (Figure 7).

3. Additional monitoring wells should be installed west of Alpine Road to determine the downgradient off-site extent of contamination. Well depths should be based on local geologic conditions, but one well in each cluster should tap the upper portion of the dolomite formation.

4. Purge well 3 currently is not pumping at its maximum capacity. The cause of the low flow rate should be investigated and the problem solved if possible.

5. A fourth purge well should be installed near PW-3 to eliminate or reduce the contaminants known to be moving off-site toward the west. The zone of capture calculated for a purge well pumping 20 gpm at the west property line will extend about 500 feet in a north-south direction. Hence, locating PW-4 250 feet south of PW-3 will assure that their zones of capture will overlap. The selection of the location for this well should be based on both existing information and the information obtained from the recommended new monitoring wells and soil vapor survey (items 1,2 and 3 above). It will be necessary to expand the treatment capacity of the air stripping tower if the flow rate from the wells exceeds about 45 gallons per minute.

6. Monitoring of the effluent from the air stripping tower shows that the tower can effectively remove the contaminants in the water to below the limits specified by the Sanitary District of Rockford . Monitoring of this treatment system should continue to assure that the system provides acceptable contaminant removal. Also, ground water monitoring should occur as described in Table 5. The monitoring information should be collected and reviewed to assure that the measurements or analyses accurately represent the local conditions. Periodically, the monitoring program should be reviewed and modified, if appropriate. This monitoring plan is in addition to the monitoring currently being conducted for the toluene cleanup program.

TABLE 5

RECOMMENDED MONITORING PROGRAM

Parameter	Monitoring Location	Frequency of Measurement	Remarks
Flow rate (gpm)	PW-1, PW-2 PW-3, tower influent and tower effluent	measured continuously but recorded weekly	Flow meters which are not working properly should be promptly repaired
Cumulative gallons pumped	as above	record weekly	
Water level	all wells	quarterly	All measurements should be made in one day
VOC Scan for identified contaminants	PW-1, PW-2 PW-3, tower influent and tower effluent	quarterly	EPA Method 601 and 602 using a gas chromatograph
1,1,1-Trichloroethane	MW-10, 11, 19 20, 21, 28A, 29, 30, 31, 31A, 32 and 32A	quarterly	111-TCA is selected because it is the most abundant contaminant.
Complete VOC scan	selected monitoring and purge wells	annual	

REFERENCES

Lohman, S.W., 1972, "Groundwater Hydraulics: U.S.G.S. Professional Paper 708," pp. 47-49.

Todd, D.K., 1980, Groundwater Hydrology: John Wiley & Sons, New York. pp. 121-123.

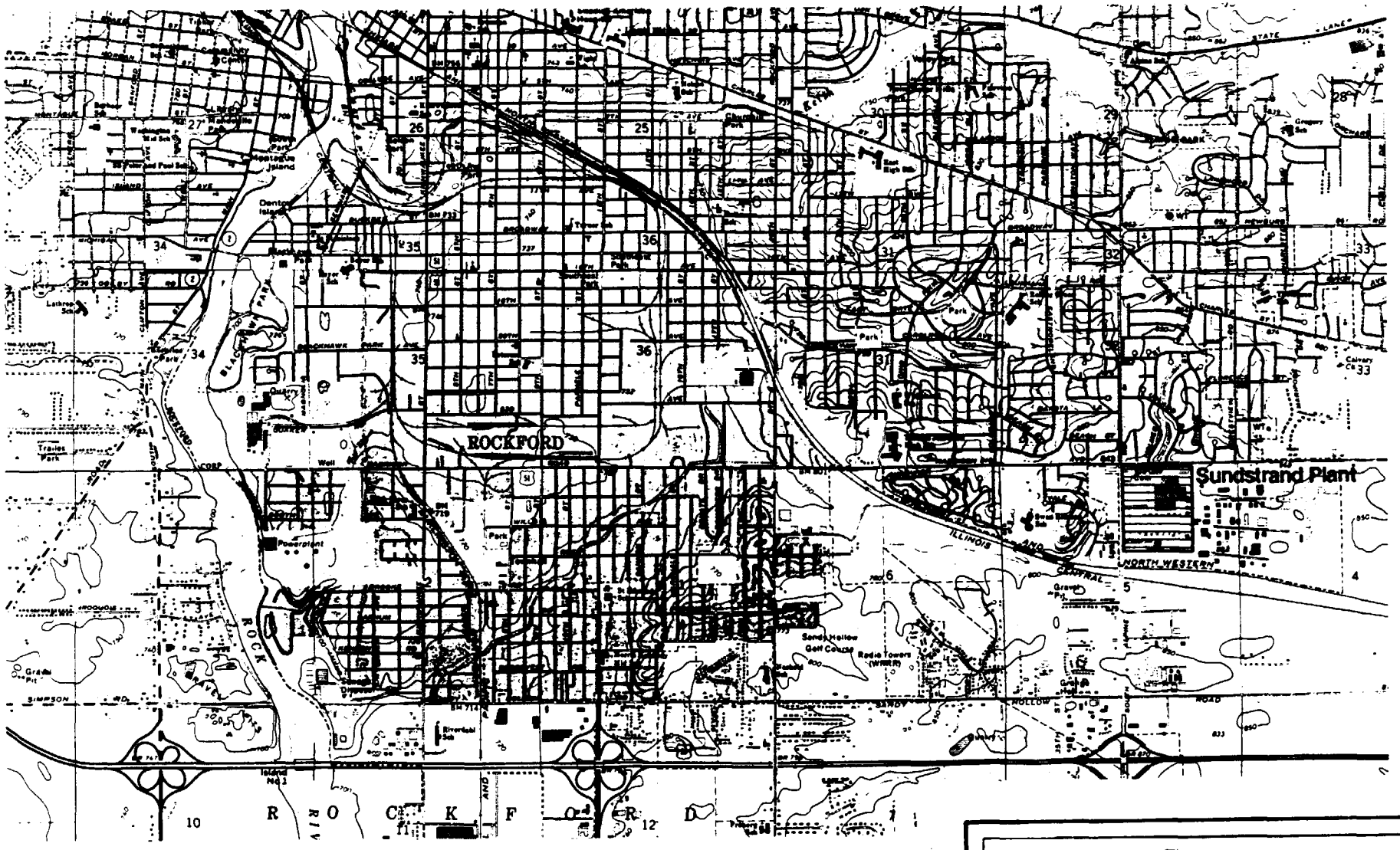
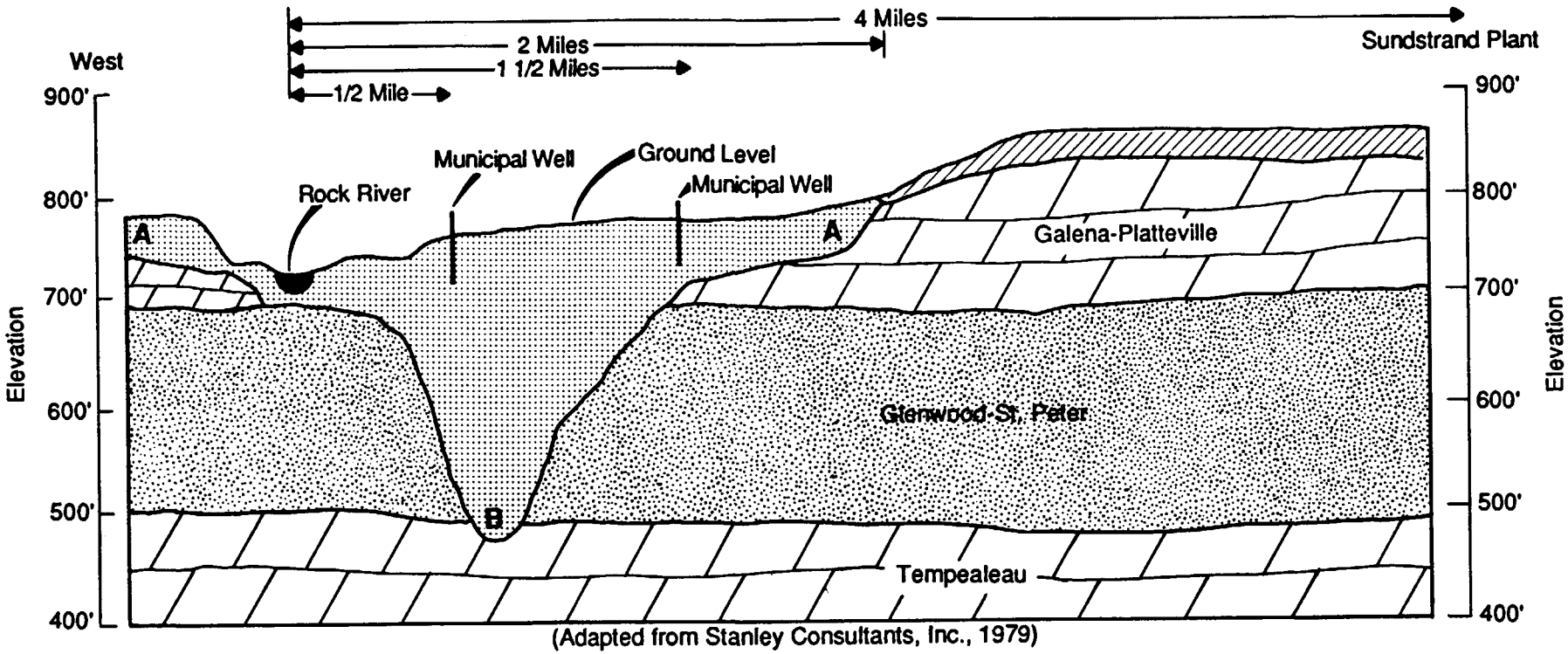


Figure 1
Location of Study Area
Sundstrand Corporation
Rockford, Illinois
July, 1988 20557

EDI Engineering & Science



(Adapted from Stanley Consultants, Inc., 1979)

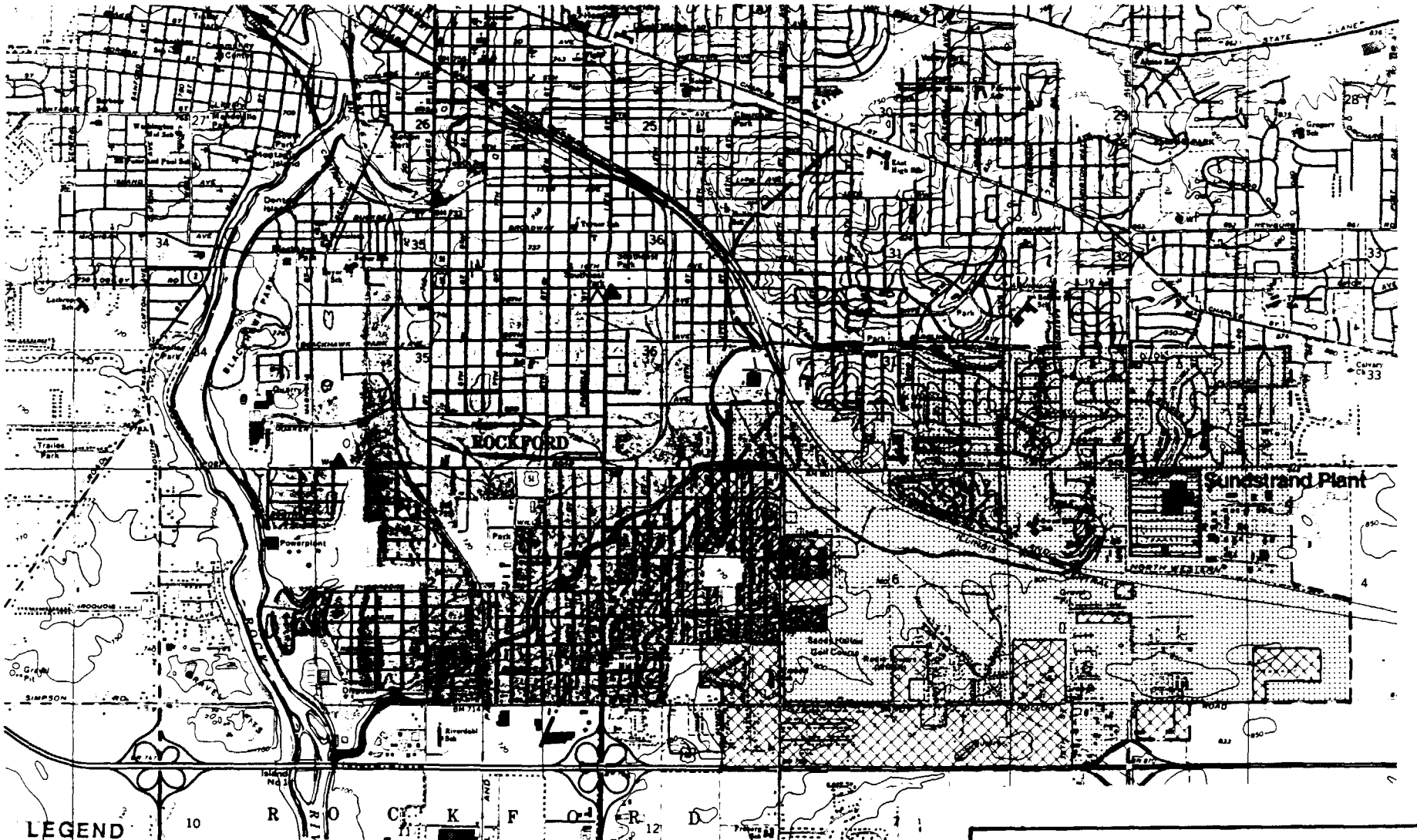
LEGEND

- **A** Intermediate Bench or Strath
- **B** Deep Channels
- Sand and Gravel Aquifer
- Sandstone Aquifer
- Glacial Drift Material
- Dolomite

Figure 6
Typical Geologic Cross-Section

Sundstrand Corporation
Rockford, Illinois

August, 1987 20557



EDI Engineering & Science

Figure 10

SELECTED WELLS AND STREAMS IN ROCKFORD AREA

Sundstrand Corporation

Rockford, Illinois

June, 1987

20557

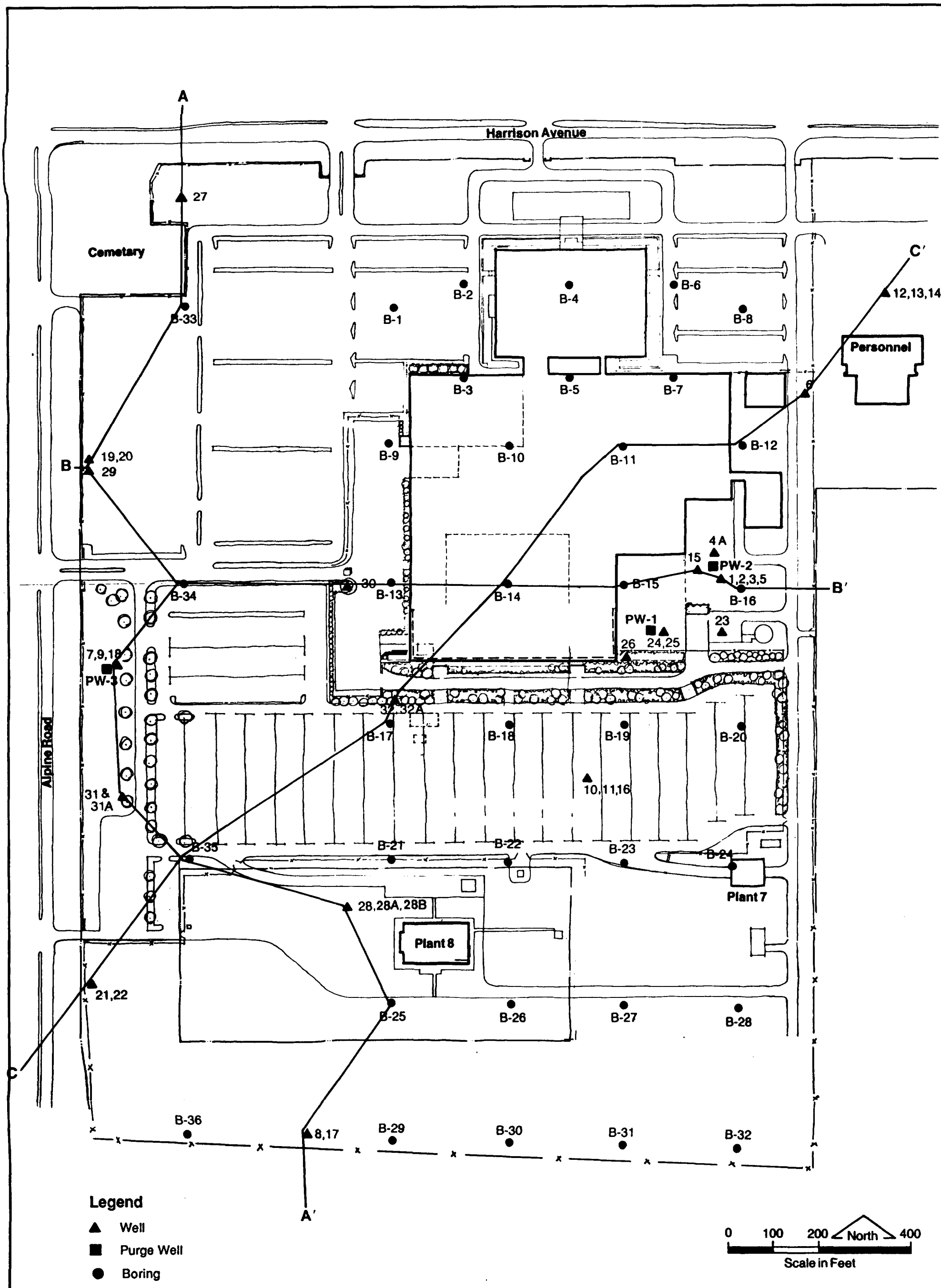


Figure 2

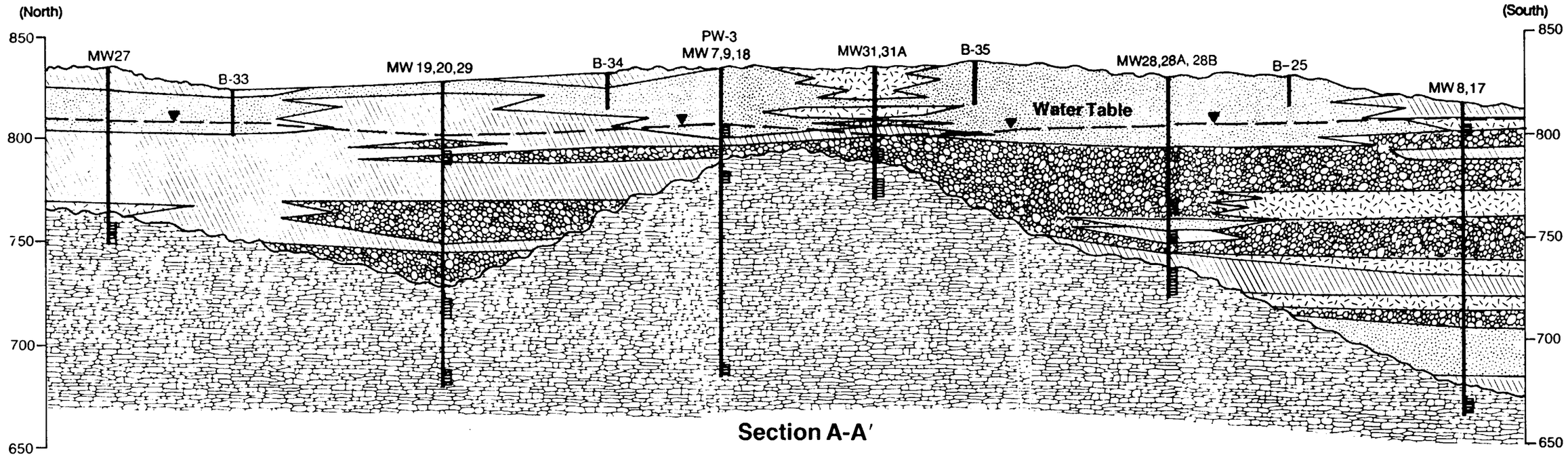
Plan Showing Location of Borings, Wells and Cross Sections

Sundstrand Corporation
Rockford, Illinois

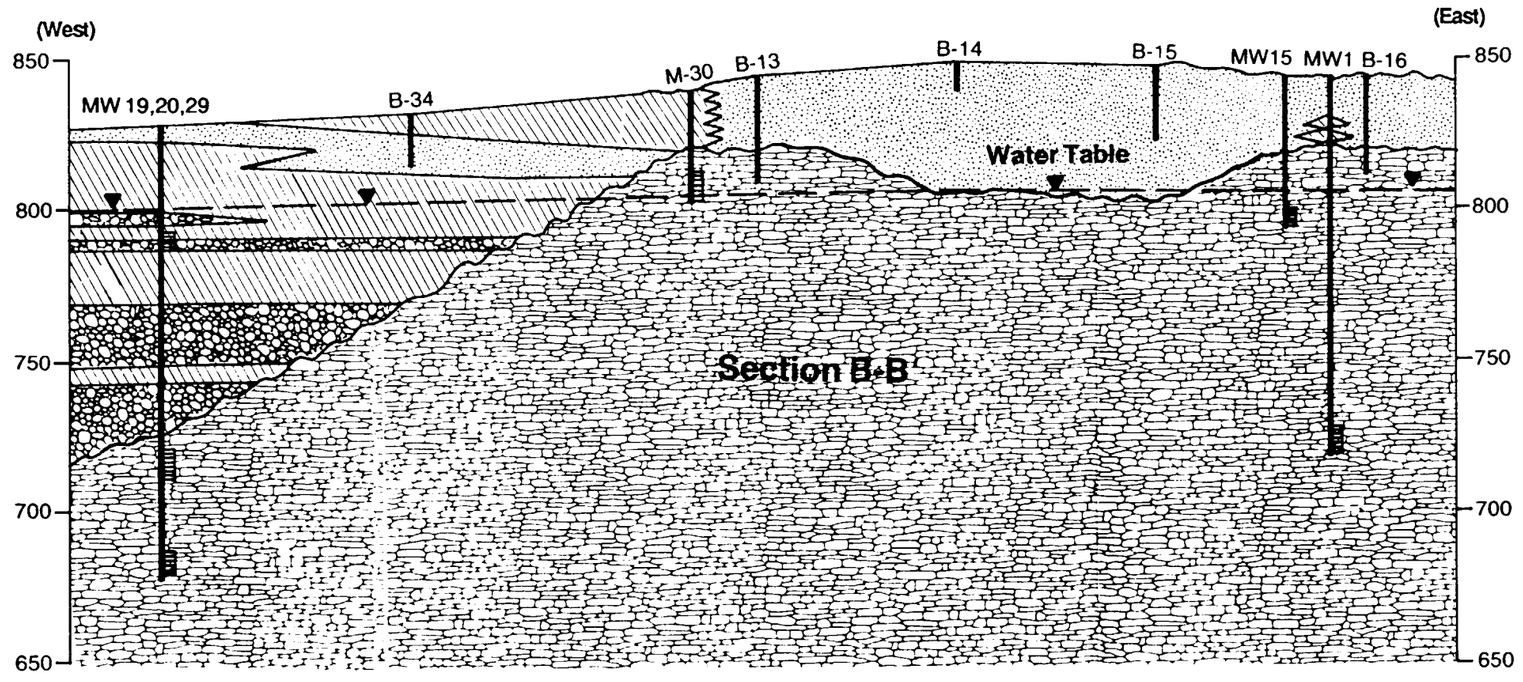
March, 1987

20557

EDI Engineering & Science



Section A-A'



Section B-B'

Legend

- Clay, Silty to Gravelly
- Silt, Clayey to Sandy
- Sand, Clayey to Gravelly
- Gravel, Clayey to Sandy
- Dolomite Bedrock
- Contact Between Soil and Bedrock (Unconformity)

Completed Intervals

Horizontal Scale: 0 50 100 200 Scale in Feet

Vertical Scale: 4x

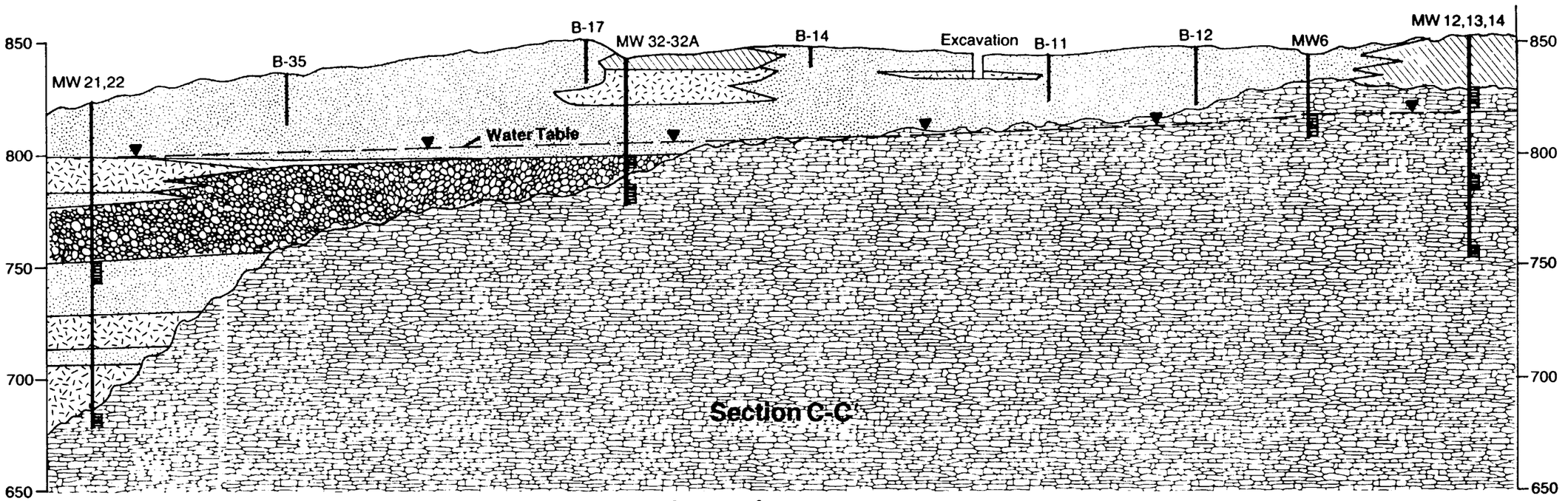
Figure 3

Cross Section A-A' and B-B'

Sundstrand Corporation
Rockford, Illinois

March, 1987 20557

(Southwest) (Northeast)



Legend

- Clay, Silty to Gravelly
- Silt, Clayey to Sandy
- Sand, Clayey to Gravelly
- Gravel, Clayey to Sandy
- Dolmite Bedrock
- Contact Between Soil and Bedrock (Unconformity)
- Completed Intervals

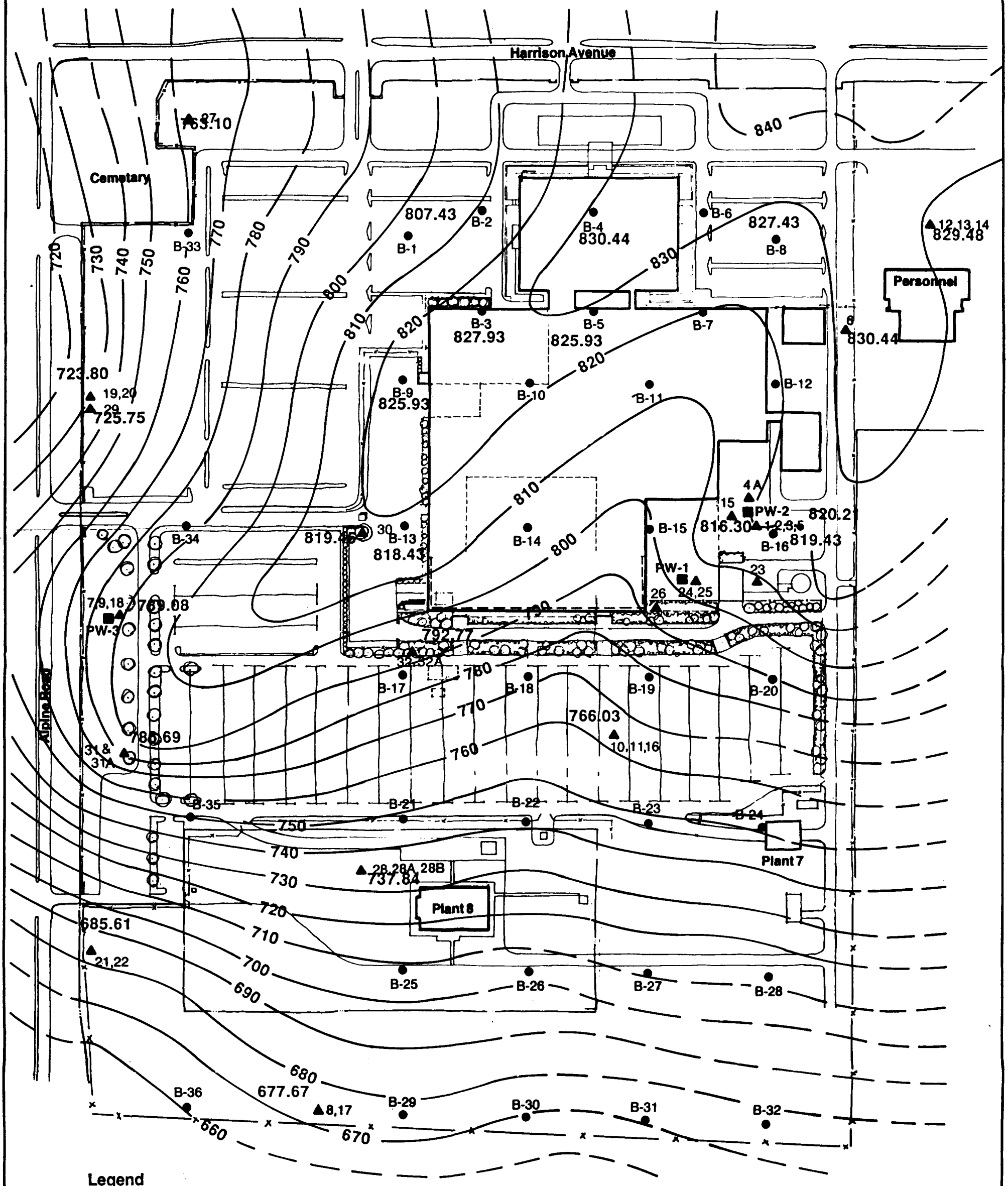
Horizontal Scale: 0 50 100 200 Scale in Feet
Vertical Scale: 4x

Figure 4

Cross Section C-C'

Sundstrand Corporation
Rockford, Illinois

March, 1987 20557



Legend

- ▲ Well
- ■ Purge Well
- ● Boring

792.77 Elevation of Top of Bedrock (USGS)

Contour Interval equals 10 ft.

0 100 200 North 400

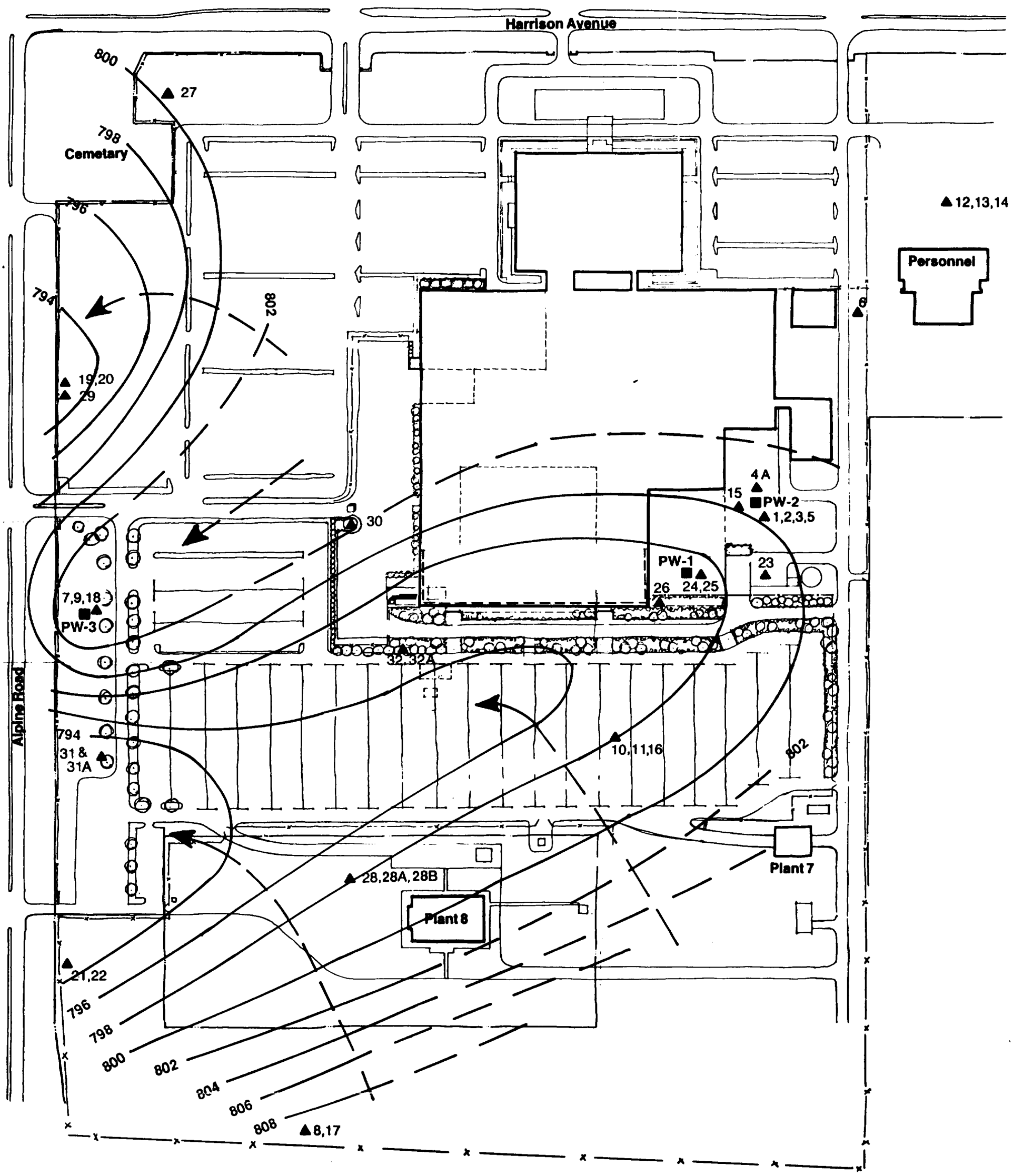
Scale in Feet

Figure 5

Topography of Bedrock Surface

Sundstrand Corporation
Rockford, Illinois

March, 1987 20557



Contours Based On March 27, 1989 Measurements. Purge Well Pumping Rate: PW1+PW2 at 21.5 gpm PW3 at 9 gpm

Figure 7
WATER LEVEL CONTOURS FOR GLACIAL DRIFT WELLS
SUNDSTRAND CORPORATION
ROCKFORD, ILLINOIS
March, 1989 20557

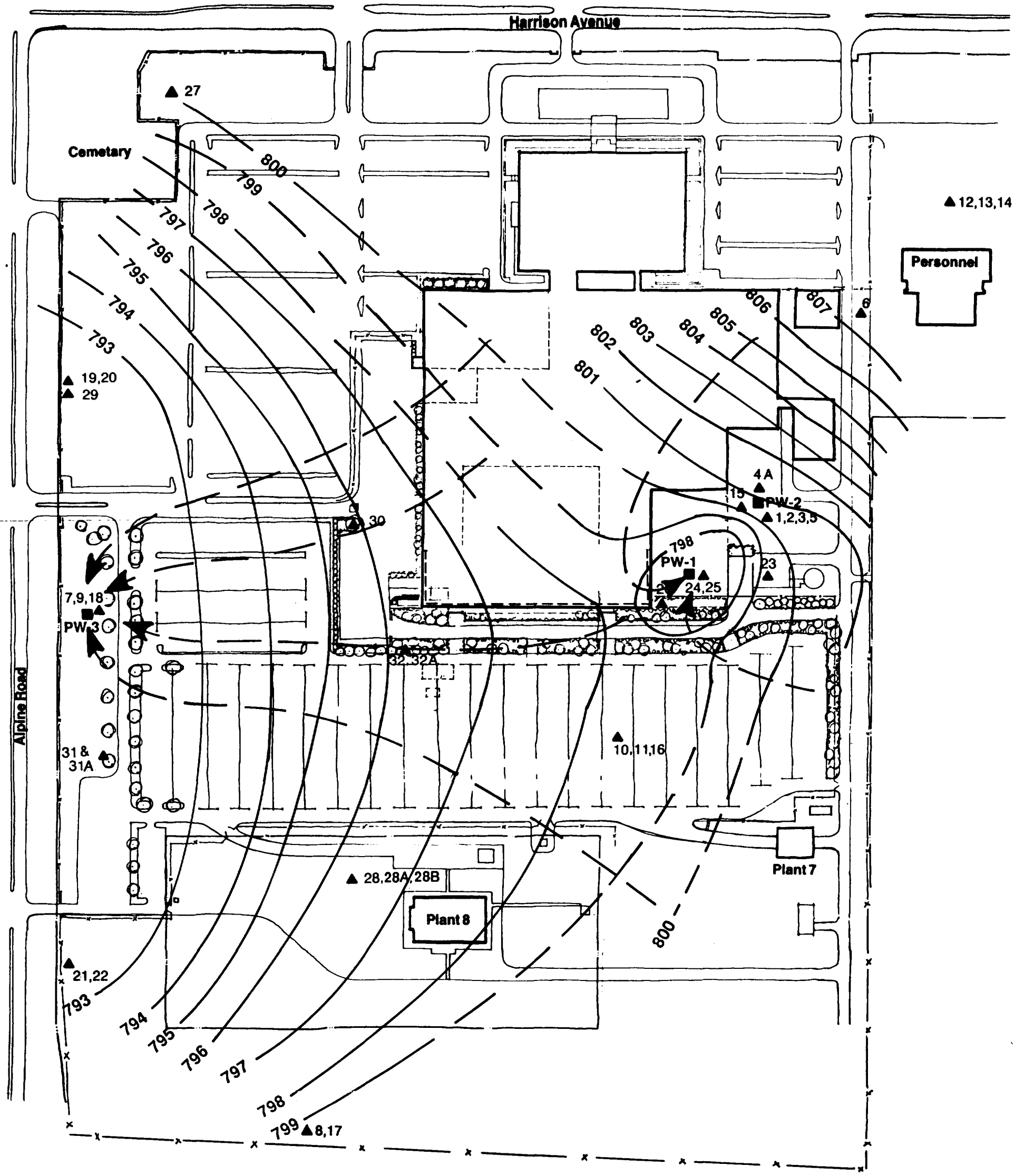
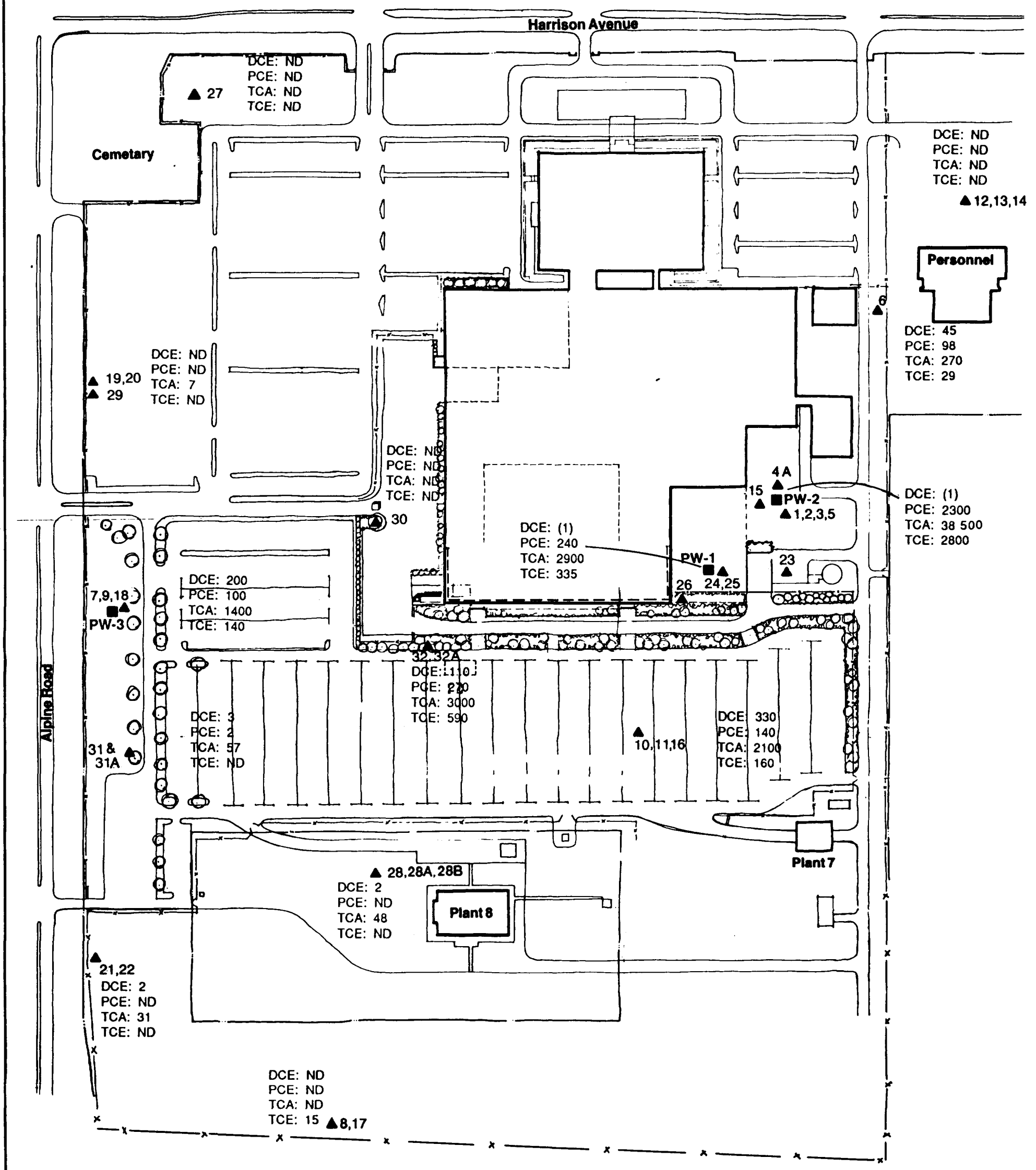


Figure 8
WATER LEVEL CONTOURS FOR BEDROCK WELLS
SUNDSTRAND CORPORATION
ROCKFORD, ILLINOIS
March, 1989 20557



Legend

- ▲ Well
- ■ Purge Well

DCE 1,1-Dichloroethylene
PCE Tetrachloroethylene
TCA 1,1,1-Trichloroethane
TCE Trichloroethylene
ND Non Detectable
(1) Not Determined

Values Shown are Highest Values Found in Analyses Shown in Table 2 and 4

Values are in Micrograms per liter

0 100 200 North 400
Scale in Feet

Figure 9
Distribution of Four Chlorinated Compounds
SUNDSTRAND CORPORATION
ROCKFORD, ILLINOIS
April, 1989 20557

EDI Engineering & Science

APPENDIX A
WELL CONSTRUCTION RECORDS

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

Page: ____ of ____ 028
Well/Boring No.: MW 27
Client: Sundstrand
Project No.: 20557
Permit No.:
Date Started 4/8 Finished 4/15/86

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	1/4 NW 1/4 NE 1/4	5	43N	2E

Contractor: Jonas Martin[illegible]
Address: Oregon, IL

Equipment: Gardner/Denver

Supervisor: Culver/Venn @ EDI

Drilling Method(s) **Depth**
8-3/4" Rotary 0-72.5'
5-1/2" Rotary 72.5-83.0'

Grouting/Seal

Depth	To	Material
0	72.5	Cement Grout

Development: Compressed air from rotary rig.

Water Level: 25.36 Ft. Below: TOC
Measured On: 4/15/86

Screen: N/A
Manufacturer:
Material:
Model:
Slot/Gauze: Dia.:
Length:
Depth Set: To:

Casing

Dia.	Type	Depth Set
6"	PVC	+2.5 To 72.5

Elevation
Casing: 834.21
Ground: 832.10
Ref. Pt.:

Location Sketch SEE LOCATION MAP

Remarks (include here, other data available)
Set-up time 45 minutes. Six lengths of drill rod on rig. Steam cleaned prior to arriving on site. Distance from rotary drive bushing to ground is 6 feet. Mud rotary with 8-3/4" bit. Air rotary with 5-1/2" bit. Drilled out 15' of cement plug before drilling into bedrock.

DRILLING PROCEDURE (BUSHING ELEVATION)
25' - Kelly
15' - Stabilizer and 25' Kelly
15' - Stabilizer and 15' Rod and 25' Kelly

(FEET) Thickness	(FEET) Depth To Base	Description	Remarks: SAMPLE DEPTHS (FT)				
1.0	1.0	TOPSOIL	4	-	19		
7.0	8.0	CLAY - gravelly to sandy, tan (glacial till)	19	-	34		
22.0	30.0	SAND - gravelly to clayey, medium to coarse grained,	42	-	49		
		brown	49	-	64		
6.0	36.0	CLAY - gravelly to sandy, brown (till), harder than	64	-	69		
		above	69	-	72		
6.0	42.0	CLAY - sandy to silty, gray, soft					
7.0	49.0	CLAY - gravelly to sandy, brown to gray (till)					
15.0	64.0	CLAY - sandy, gray to brown (till)					
5.0	69.0	SILT - gray to brown (possibly weathered bedrock)					
14.0	83.0	DOLOMITE - fine crystalline, tan, very hard					
		(weathered at top)					

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

611 Cascade West Pkwy, SE; Grand Rapids, MI 49506-2179; (616) 942-9600

Page:___of___ 028
Well/Boring No.: MW 28
Client: Sundstrand
Project No.: 20557
Permit No.:
Date Started 4/9 Finished 4/15/86

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	1/4 NW 1/4 NE 1/4	5	43N	2E

Contractor: Jonas Martin
Address: Oregon, IL

Equipment: Gardner/Denver

Supervisor: Culver/Venn @ EDI

Drilling Method(s) **Depth**
8-3/4" Rotary 0-97.0'
5-1/2" Rotary 97-107'

Grouting/Seal

Depth	To	Material
0	97'	Cement Grout

Development: Compressed air from rotary rig.

Water Level: 26.70 Ft. Below: TOC
Measured On: 4/15/86

Screen: N/A
Manufacturer:
Material:
Model:
Slot/Gauze: Dia.:
Length:
Depth Set: To:

Casing

Dia.	Type	Depth Set
6"	PVC	5.0 To 97.0
6"	Blk.Stl.	+2.0 To 5.0

Elevation
Casing: 830.35
Ground: 828.84
Ref. Pt.:

Location Sketch SEE LOCATION MAP

Remarks (include here, other data available)
Mud rotary with 8-3/4" bit. Air rotary with 5-1/2" bit. Drilled out 15' cement plug before drilling into bedrock.

(FEET) Thick-ness	(FEET) Depth To Base	Description	Remarks: SAMPLE DEPTH (FT)			
1.0	1.0	TOPSOIL	35	-	50	
14.0	15.0	SAND - gravelly to clayey, coarse grained, tan	50	-	64	
20.0	35.0	SAND - gravelly, coarse grained, tan, some clay;	64	-	79	
		drilled hard; fragments of dolomite.	79	-	91	
35.0	70.0	GRAVEL - sandy, fine to coarse grained, tan. Inter-	91	-	97	
		bedded with thin layers of clay. Drilled				
		very hard. Fragments of chert and dolomite.				
		Individual fragments up to 1/2" diameter.				
5.0	75.0	SAND - gravelly, tan, coarse grained				
5.0	80.0	CLAY - tan to gray				
7.0	87.0	GRAVEL - sandy, fine to coarse grained, tan				
4.0	91.0	CLAY - gravelly to sandy, tan to gray				
16.0	107.0	DOLOMITE - fine crystalline, yellow to tan				

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

Page: 1 of 1 028
Well/Boring No.: MW 28A
Client: Sundstrand - Rockford
Project No.: 20557
Permit No.:
Date Started 11/1 Finished 11/17/86

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	¼ NW ¼ NE ¼	5	43N	2E

Contractor: Jonas Martin
Address: Oregon, IL
Equipment: Gardner/Denver
Supervisor: Johnson/Venn

Drilling Method(s)	Depth
6" Rotary	0-65'

Grouting/Seal

Depth	To	Material
0	58'	Crushed Limestone
58	61'	Bentonite Seal
61	65'	Gravel Pack

Development: Compressed Air from Rotary Rig with 3/4" Drop Pipe.

Water Level: 27.81 Ft. Below: TOC
Measured On: 11/20/86

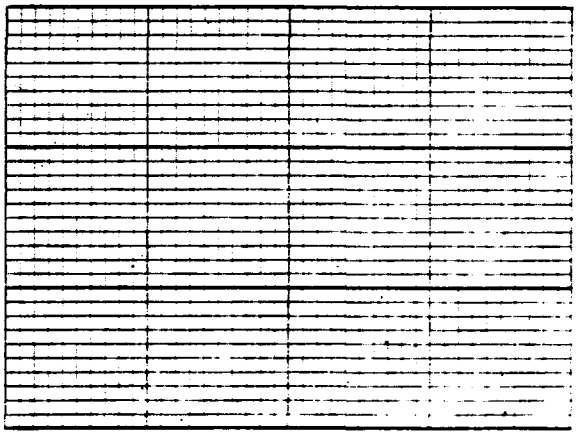
Screen:
Manufacturer: Johnson
Material: stainless steel
Model: 7283
Slot/Gauze: 2P/3T Dia.: 2"
Length: 4'
Depth Set: 61' To: 65'

Casing

Dia.	Type	Depth Set
2"	Galv.	+2 To 61'
4"	Steel	+2 To 4'

Elevation
Casing: 830.69'
Ground:
Ref. Pt.:

Location Sketch: SEE LOCATION MAP



Remarks (include here, other data available)
A 4" diameter protective steel casing was cemented in and around above-ground portion of 2" pipe. Teflon tape on casing joints.

Remarks: NO SOIL SAMPLES COLLECTED

(FEET) Thickness	(FEET) Depth To Base	Description	SAMPLE DEPTH/ft.
		SEE: MW 28 for description of subsurface soils.	

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

Page: 1 of 1 028
Well/Boring No.: MW 28B
Client: Sundstrand - Rockford
Project No.: 20557
Permit No.:
Date Started 11/14 Finished 11/17/86

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	1/4 NW 1/4 NE 1/4	5	43N	2E

Contractor: Jonas Martin
Address: Oregon, IL

Equipment: Gardner/Denver

Supervisor: Johnson/Venn

Drilling Method(s) / **Depth**
6" Rotary 0-85'

Grouting/Seal

Depth	To	Material
0	78'	Crushed Limestone
78	81'	Bentonite Seal
81	85'	Gravel Pack

Development: Compressed Air from Rotary Rig with 3/4" Diameter Drop Pipe

Water Level: 27.41 Ft. Below: TOC
Measured On: 11/20/86

Screen:
Manufacturer: Johnson
Material: stainless steel
Model: 7283
Slot/Gauze: 2P/3T Dia.: 2"
Length: 4'
Depth Set: 81' To: 85'

Casing

Dia.	Type	Depth Set	To	
2"	Galv.	+2	To	81'
4"	Steel	+2	To	4'

Elevation
Casing: 830.59'
Ground:
Ref. Pt.:

Location Sketch: SEE LOCATION MAP

Remarks (include here, other data available)
A 4" diameter protective steel casing was cemented in and around above-ground portion of 2" pipe. Teflon tape on casing joints.

Remarks: NO SOIL SAMPLES COLLECTED

SAMPLE DEPTH/ft.

(FEET) Thick-ness	(FEET) Depth To Base	Description
		SEE: MW 28 for description of surface soils.

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

Page: ___ of ___ 028

Well/Boring No.: MW 29

Client: Sundstrand

Project No.: 20557

Permit No.:

Date Started 4/11 Finished 4/14/86

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	1/4 NW 1/4 NE 1/4	5	43N	2E

Contractor: Jonas Martin

Address: Oregon, IL

Equipment: Gardner/Denver

Supervisor: Culver/Venn @ EDI

Drilling Method(s) **Depth**

8-3/4" Rotary 0-103'

5-1/2" Rotary 103-113'

Grouting/Seal

Depth	To	Material
0	103'	Cement Grout

Development: Compressed air from rotary rig.

Water Level: 28.17 Ft. Below: TOC

Measured On: 4/15/86

Screen: N/A

Manufacturer:

Material:

Model:

Slot/Gauze: Dia.:

Length:

Depth Set: To:

Casing

Dia.	Type	Depth Set
6"	PVC	5.0 To 103'
6"	Blk. Stl.	+3.0 To 5.0

Elevation

Casing: 827.81

Ground: 825.75

Ref. Pt.:

Location Sketch SEE LOCATION MAP

Remarks (include here, other data available)

Mud rotary with 8-3/4" bit. Air rotary with 5-1/2" bit. Drilled out 15' of cement plug before drilling into bedrock.

(FFET) Thick-ness	(FEET) Depth To Base	Description	Remarks: SAMPLE DEPTH (FT)		
0.5	0.5	TOPSOIL	0	-	20
3.5	4.0	SAND - fine to medium grained, brown to black	20	-	35
23.0	27.0	CLAY - gravelly to sandy, tan	35	-	50
3.0	30.0	GRAVEL - sandy to clayey, tan	50	-	65
4.0	34.0	CLAY - gravelly to sandy, gray	65	-	80
4.0	38.0	GRAVEL - sandy to clayey, tan	80	-	100
19.0	57.0	CLAY - gravelly to sandy, gray	100	-	103
19.0	76.0	GRAVEL - sandy to clayey, gray to tan			
6.0	82.0	CLAY - red to brown			
18.0	100.0	GRAVEL - sandy, gray			
13.0	113.0	DOLOMITE - fine crystalline, tan to orange, weathered at top			

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

Page: ____ of ____ 028
Well/Boring No.: MW 30
Client: Sundstrand
Project No.: 20557
Permit No.:
Date Started 4/15 Finished 4/17/86

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	1/4 NW 1/4 NE 1/4	5	43N	2E

Contractor: Jonas Martin
Address: Oregon, IL
Equipment: Gardner/Denver
Supervisor: Culver/Venn @ EDI

Drilling Method(s) — **Depth**
8-3/4" Rotary 0-29'
5-1/2" Rotary 29-39'

Grouting/Seal

Depth	To	Material
0	29'	Cement Grout

Development: Compressed air from rotary rig.

Water Level: 37.38 Ft. Below: TOC
Measured On: 4/18/86

Screen: N/A
Manufacturer:
Material:
Model:
Slot/Gauze: ____ Dia.:
Length:
Depth Set: ____ To:

Casing

Dia.	Type	Depth Set
6"	PVC	7.0 To 29.0
6"	Blk.Stl.	+2.0 To 7.0

Elevation
Casing: 841.62
Ground: 839.45
Ref. Pt.:

Location Sketch SEE LOCATION MAP

Remarks (include here, other data available)
Mud rotary with 8-3/4" bit. Air rotary with 5-1/2" bit. Drilled out 15' cement plug before drilling into bedrock.

(FEET) Thick-ness	(FEET) Depth To Base	Description	Remarks — SAMPLE DEPTH (FT)		
7.0	7.0	CLAY - gravelly and sandy, tan (soft)	0	-	10
7.0	14.0	CLAY - silty, tan (soft), minor gravel	10	-	16
6.0	20.0	CLAY - gravelly and sandy, tan (hard)	16	-	20
19.0	39.0	DOLOMITE - fine crystalline, tan (drilled hard)	20	-	23
			23	-	29

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

 028

Well/Boring No.: MW 31
Client: Sundstrand - Rockford
Project No.: 20557
Permit No.:
Date Started 11/13 Finished 11/13/86

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	1/4 NW 1/4 NE 1/4	5	43N	2E

Contractor: Jonas Martin
Address: Oregon, IL

Equipment: Gardner/Denver

Supervisor: Johnson/Venn

Drilling Method(s) — **Depth**
8-3/4" Rotary — 0-55'
5-1/2" Rotary — 55-65'

Grouting/Seal

Depth	To	Material
0	55'	Cement Grout

Development: Compressed Air from Rotary Rig

Water Level: 35.38 Ft. Below: TOC
Measured On: 11/20/86

Screen: N/A
Manufacturer:
Material:
Model:
Slot/Gauze: Dia.:
Length:
Depth Set: To:

Casing

Dia.	Type	Depth Set
6"	PVC	4.0 To 55.0'
6"	Blk Steel	+2 To 4.0'

Elevation
Casing: 834.94'
Ground: 833.69'
Ref. Pt.:

Location Sketch: SEE LOCATION MAP

Remarks (Include here, other data available)
Mud rotary with 8-3/4" bit. Air rotary with 5-1/2" bit. Drilled out 15 foot cement plug before drilling into bedrock.

(FEET) Thick-ness	(FEET) Depth To Base	Description	SAMPLE DEPTH/ft.		Remarks			
31.0	31.0	SILT - sandy to clayey, some gravel	14	20				
1.0	32.0	GRAVEL - sandy (hard), tan to gray	28	30				
5.0	37.0	SILT - clayey to sandy, minor gravel	31	32				
10.0	47.0	GRAVEL - sandy (hard), tan to gray, grading downward	32	35				
		to weathered bedrock	47	50				
18.0	65.0	DOLOMITE - fine, crystalline, tan to orange-brown,	50	52				
		weathered at top	52	53				

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

Page: 1 of 1 028
Well/Boring No.: MW 31A
Client: Sundstrand - Rockford
Project No.: 20557
Permit No.:
Date Started 11/19 Finished 11/19/86

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	¼ NW ¼ NE ¼	5	43N	2E

Contractor: Jonas Martin
Address: Oregon, IL
Equipment: Gardner/Denver
Supervisor: Johnson/Venn

Drilling Method(s)	Depth
6" Rotary	0-45'

Grouting/Seal

Depth	To	Material
0	38'	Crushed Limestone
38	41'	Bentonite Seal
41	45'	Gravel Pack

Development: Compressed Air from Rotary Rig with 3/4" Drop Pipe

Water Level: 36.74 Ft. Below: TOC
Measured On: 11/20/86

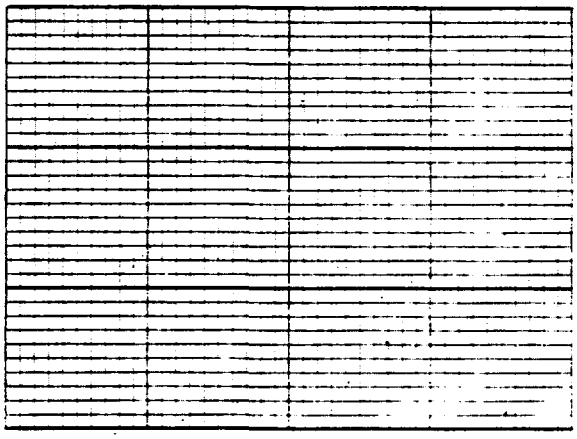
Screen:
Manufacturer: Johnson
Material: stainless steel
Model: 7283
Slot/Gauze: 2P/3T Dia.: 2"
Length: 4'
Depth Set: 41' To: 45'

Casing

Dia.	Type	Depth Set
2"	Galv.	+2 To 41'
4"	Steel	+2 To 4'

Elevation
Casing: 835.99'
Ground:
Ref. Pt.:

Location Sketch: SEE LOCATION MAP



Remarks (include here, other data available)

A 4" diameter protective steel casing was cemented in and around above-ground portion of 2" pipe. Teflon tape on casing joints.

Remarks: NO SOIL SAMPLES COLLECTED

(FEET) Thickness	(FEET) Depth To Base	Description	SAMPLE DEPTH/ft.
		SEE: MW 31 for description of subsurface soils.	

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

Page: 1 of 1 MW 32 028
Well/Boring No.:
Client: Sundstrand - Rockford
Project No.: 20557
Permit No.:
Date Started 11/11 Finished 11/12/86

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	¼ NW ¼ NE ¼	5	43N	2E

Contractor: Jonas Martin
Address: Oregon, IL
Equipment: Gardner/Denver
Supervisor: Johnson/Venn

Drilling Method(s) — **Depth**
8-3/4" Rotary — 0-56'
5-1/2" Rotary — 56-66'

Grouting/Seal

Depth	To	Material
0	56'	Cement Grout

Development: Compressed Air from Rotary Rig

Water Level: 41.31 Ft. Below: TOC
Measured On: 11/20/86

Screen: N/A
Manufacturer:
Material:
Model:
Slot/Gauze: Dia.:
Length:
Depth Set: To:

Casing

Dia.	Type	Depth Set	To
6"	PVC	4	56'
6"	Blk.Stl.	+2	4'

Elevation
Casing: 844.77'
Ground: 842.77'
Ref. Pt.:

Location Sketch: SEE LOCATION MAP

Remarks (include here, other data available)
Mud rotary with 8-3/4" bit. Air rotary with 5-1/2" bit. Drilled out 15 foot cement plug before drilling into bedrock.

(FEET) Thick-ness	(FEET) Depth To Base	Description	Remarks SAMPLE DEPTH/ft.	
0.0	16.0	SILT - clayey to sandy, some gravel and rock fragments,	0-	12
	·	tan	24-	25
8.0	24.0	SILT - clayey to sandy, minor fine gravel, tan	25-	32
1.0	25.0	GRAVEL - sandy (hard), gray	44-	47
9.0	34.0	SAND - silty to clayey, with gravel, tan	50-	53
1.0	35.0	GRAVEL - sandy (hard), gray	53-	54
9.0	44.0	SILT - sandy to clayey, tan	54-	55
6.0	50.0	GRAVEL - sandy, tan to gray		
16.0	66.0	DOLOMITE - fine, crystralline, tan to orange-brown,		
		weathered at top		

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

Page: 1 of 1 028
Well/Boring No.: MW 32A
Client: Sundstrand - Rockford
Project No.: 20557
Permit No.:
Date Started 11/20 Finished 11/20/86

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	¼ NW ¼ NE ¼	5	43N	2E

Contractor: Jonas Martin
Address: Oregon, IL
Equipment: Gardner/Denver
Supervisor: Johnson/Venn

Drilling Method(s)	Depth
6" Rotary	0-48'

Grouting/Seal

Depth	To	Material
0	41'	Crushed Limestone
41	44'	Bentonite Seal
44	48'	Gravel Pack

Development: Compressed Air from Rotary Rig with 3/4" Drop Pipe

Water Level: 41.20 Ft. Below: TOC
Measured On: 11/20/86

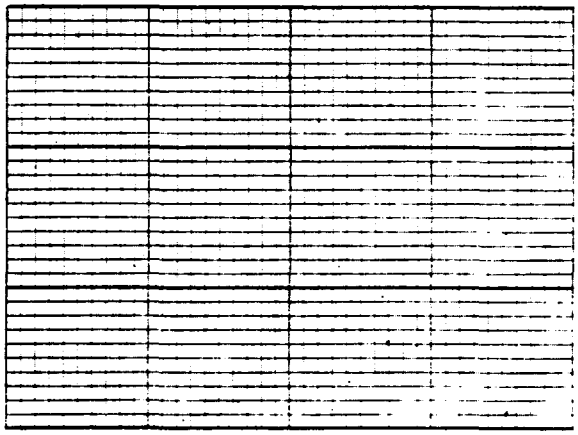
Screen:
Manufacturer: Johnson
Material: stainless steel
Model: 7283
Slot/Gauze: 2P/3T Dia.: 2"
Length: 4'
Depth Set: 44' To: 48'

Casing

Dia.	Type	Depth Set
2"	Galv.	+2 To 44'
4"	Steel	+2 To 4'

Elevation
Casing: 844.61'
Ground:
Ref. Pt.:

Location Sketch: SEE LOCATION MAP



Remarks (include here, other data available)

A 4" diameter protective steel casing was cemented in and around above-ground portion of 2" pipe. Teflon tape on casing joints.

Remarks: NO SOIL SAMPLES COLLECTED

(FEET) Thickness	(FEET) Depth To Base	Description	SAMPLE DEPTH/ft.
		SEE: MW 32 for description of subsurface soils.	

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry
611 Cascade West Pkwy, SE; Grand Rapids, MI 49546-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

028

Well/Boring No.: PW-3
Client: Sundstrand Corporation
Project No.: 20557
Permit No.:
Date Started 2/3 Finished 2/7/87

Well / Boring Log Sheet

County	Township	Fraction	Section	T	R
WINNEBAGO	CITY OF ROCKFORD	1/4 NW 1/4 NE 1/4	5	43N	2E

Contractor: Jonas Martin
Address: Oregon, IL
Equipment: Gardner/Denver
Supervisor: J. Venn

Drilling Method(s) **Depth**
8-3/4" Rotary 0.0-56.5'
5-1/2" Rotary 56.5-95.0'

Grouting/Seal

Depth	To	Material
0.0	56.5'	Cement Grout

Development: Compressed Air from Rotary Rig

Water Level: Ft. Below:
Measured On:

Screen: NA
Manufacturer:
Material:
Model:
Slot/Gauze: Dia.:
Length:
Depth Set: To:

Casing

Dia.	Type	Depth Set
6"	Black Steel	+2.0 To 56.3'
		To

Elevation
Casing:
Ground:
Ref. Pt.:

Location Sketch : SEE LOCATION MAP

Remarks (include here, other data available)
Mud rotary with 8-3/4" bit. Air rotary with 5-1/2" bit.
Drilled out 15' cement plug before drilling into bedrock.

Thickness	Depth To Base	Description	Remarks				
		NO SAMPLES COLLECTED					

Well/Boring No.: MW-1
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/10/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From ___ ft. to ___ ft: Dia ___ : Material ____
From ___ ft. to ___ ft: Dia ___ : Material ____

Type of Fluid in Hole: Depth to Fluid ____ Type ____

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 124.7 ft.

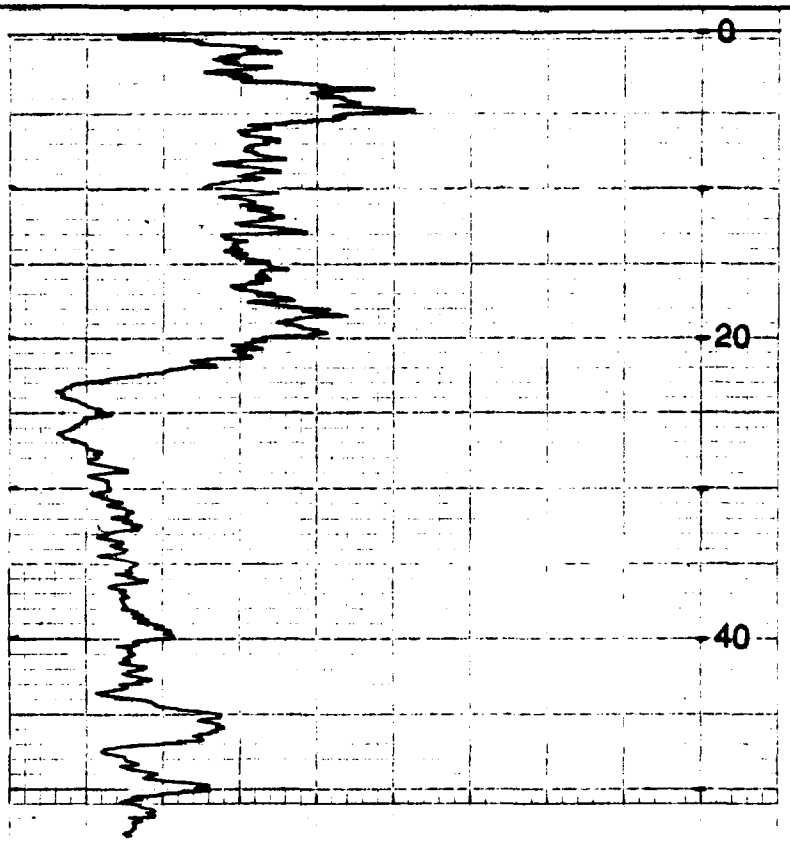
Instrument: Johnson Keck, Model SR-3000

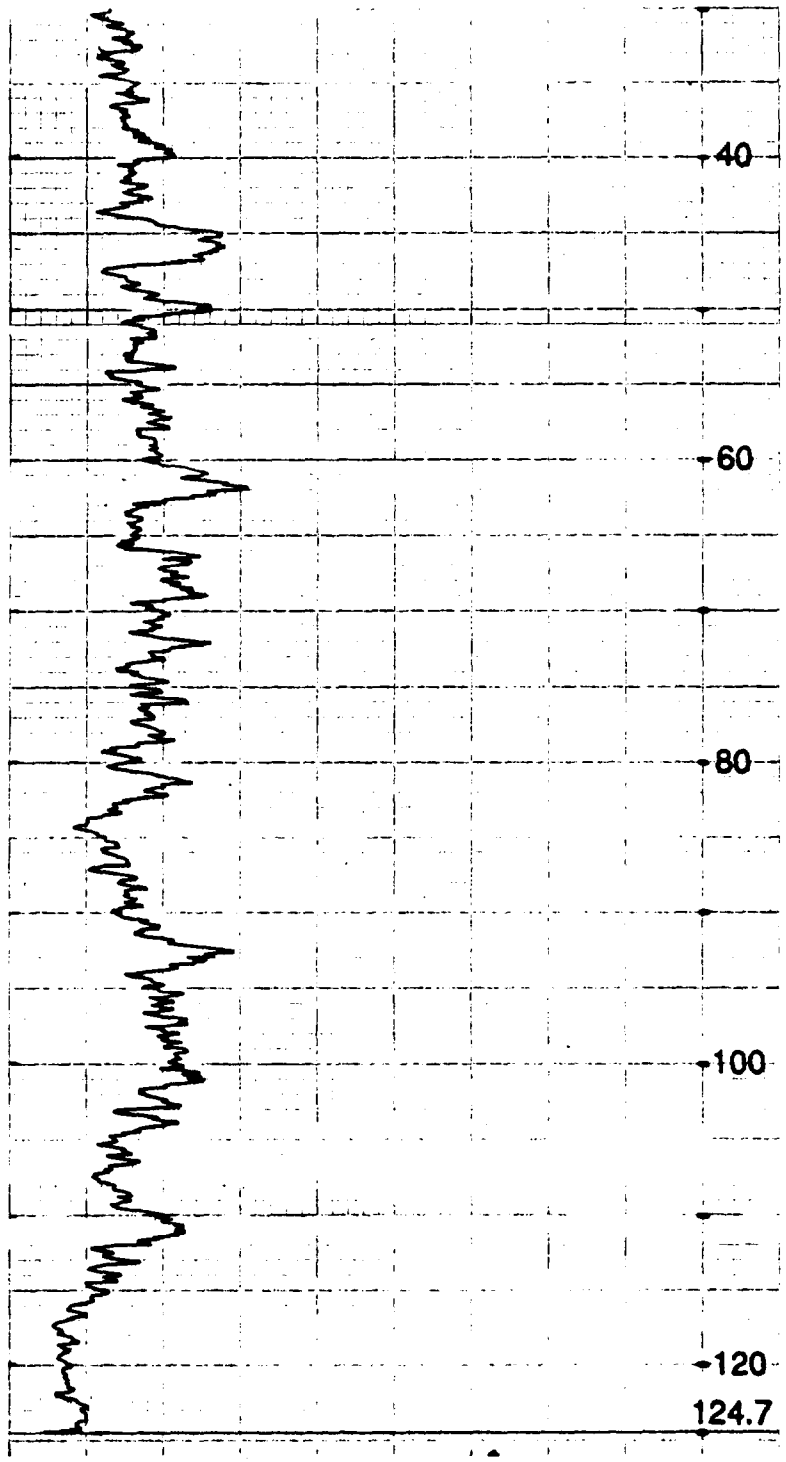
Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: ____

Scale
Counts/Minutes

200 — 2000




40
60
80
100
120
124.7

Well/Boring No.: MW-8
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/9/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From ___ ft. to ___ ft: Dia ___ : Material ____
From ___ ft. to ___ ft: Dia ___ : Material ____

Type of Fluid in Hole: Depth to Fluid ____ Type ____

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 16.4 ft.

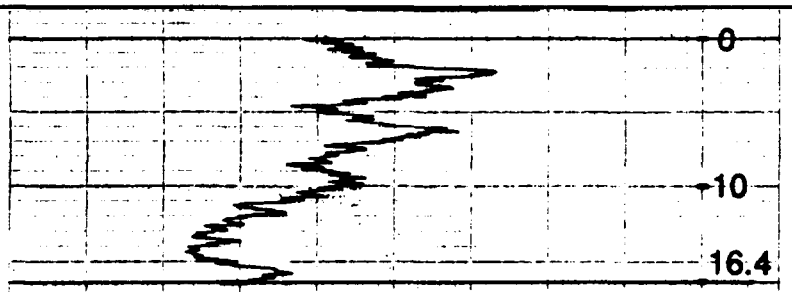
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: ____

Scale
Counts/Minutes

200 — 2000



Well/Boring No.: MW-14
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/10/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From ___ ft. to ___ ft: Dia ___ : Material ____
From ___ ft. to ___ ft: Dia ___ : Material ____

Type of Fluid in Hole: Depth to Fluid ____ Type ____

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 98.5 ft.

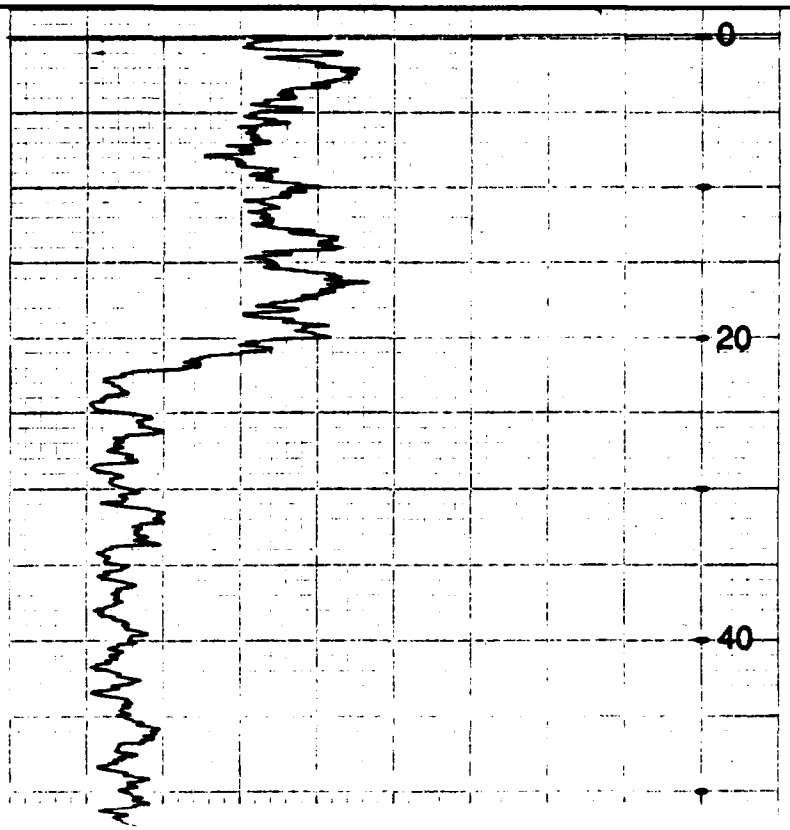
Instrument: Johnson Keck, Model SR-3000

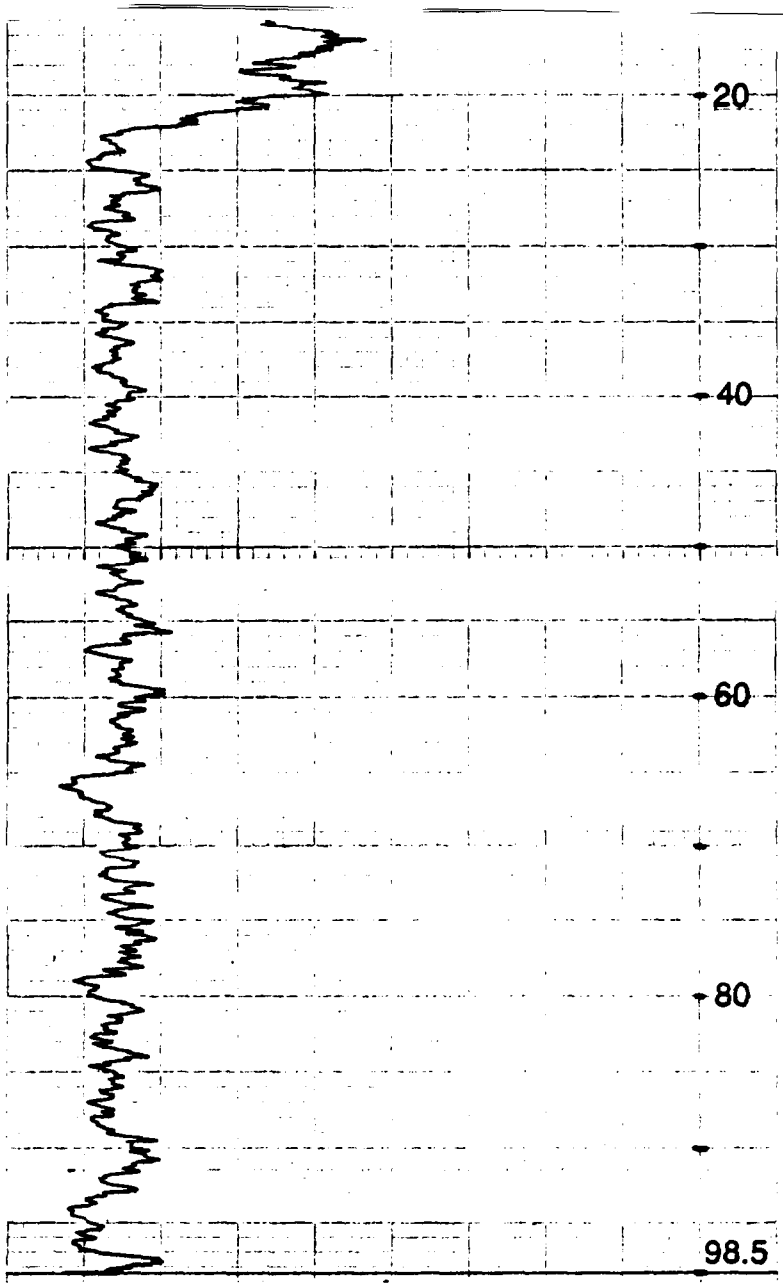
Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: ____

Scale
Counts/Minutes

200 — 2000




20
40
60
80
98.5

Well/Boring No.: MW-16
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/11/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From ___ ft. to ___ ft: Dia ___ : Material ____
From ___ ft. to ___ ft: Dia ___ : Material ____

Type of Fluid in Hole: Depth to Fluid ____ Type ____

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 195.3 ft.

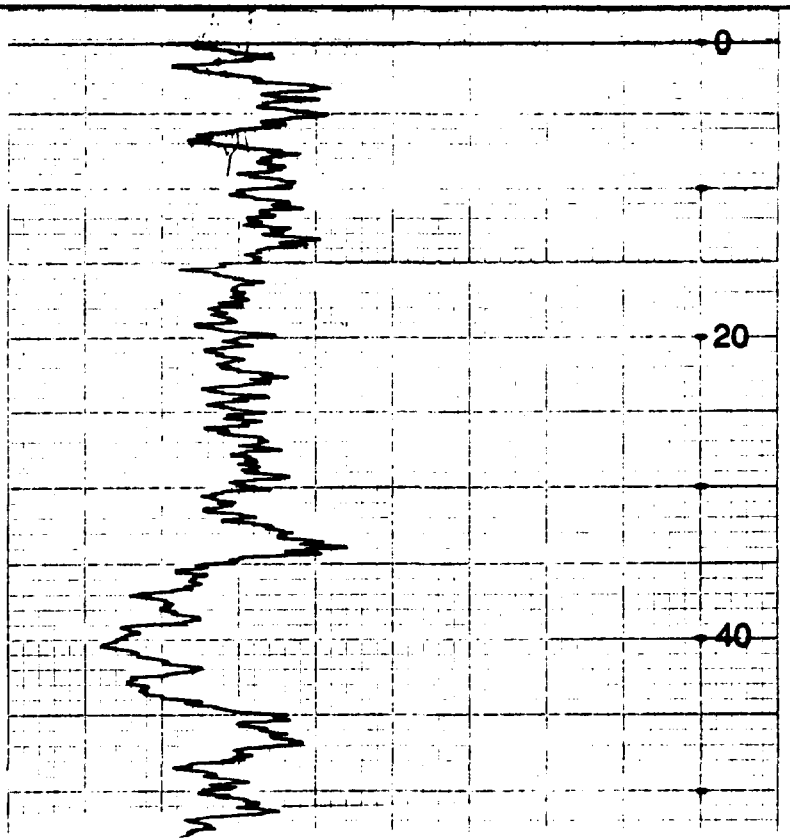
Instrument: Johnson Keck, Model SR-3000

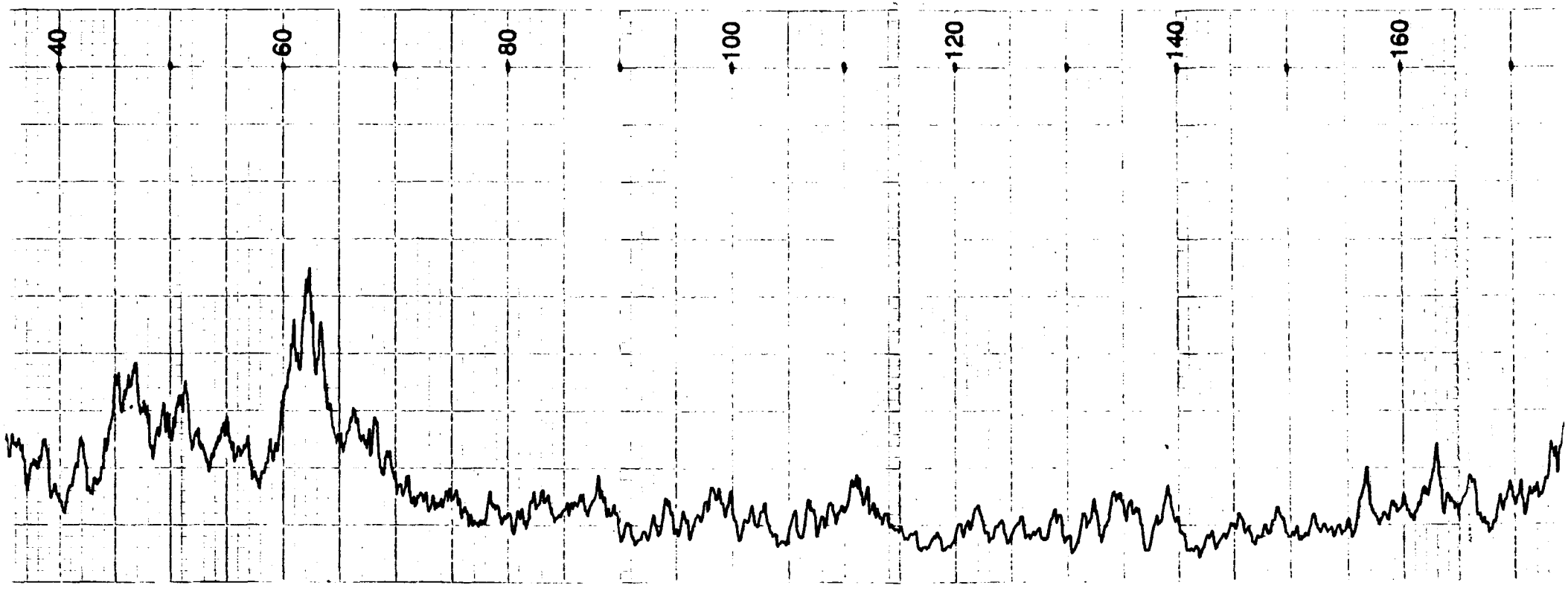
Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

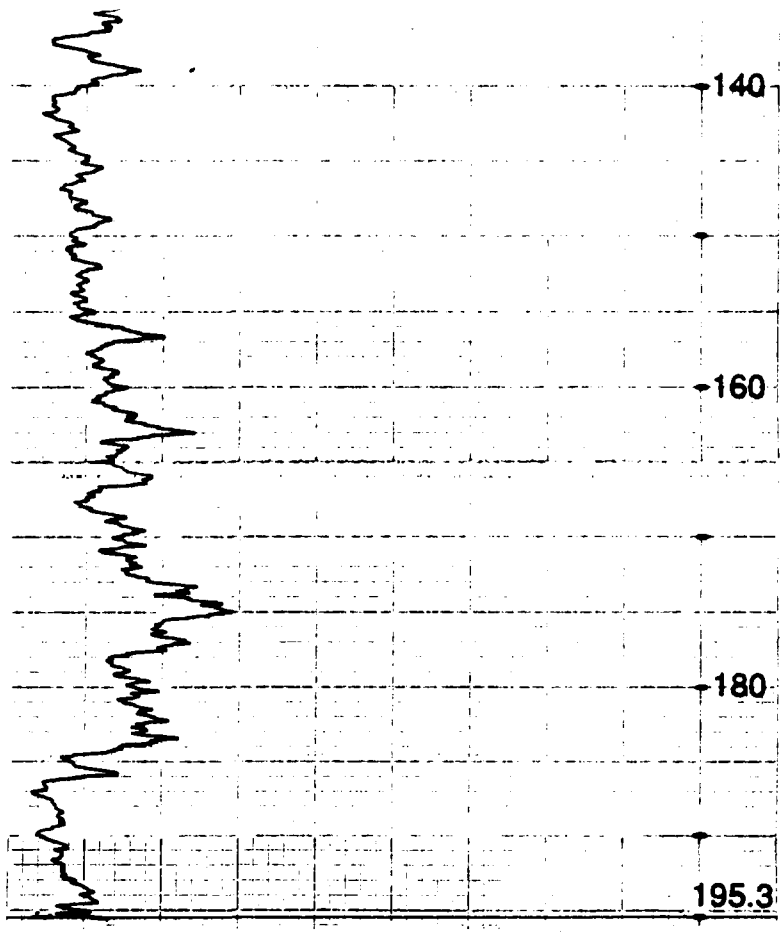
Probe: ____

Scale
Counts/Minutes

200 — 2000




40
60
80
100
120
140
160


140
160
180
195.3

Well/Boring No.: MW-17
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/9/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From ___ ft. to ___ ft: Dia ___ : Material ____
From ___ ft. to ___ ft: Dia ___ : Material ____

Type of Fluid in Hole: Depth to Fluid ____ Type ____

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 149.8 ft.

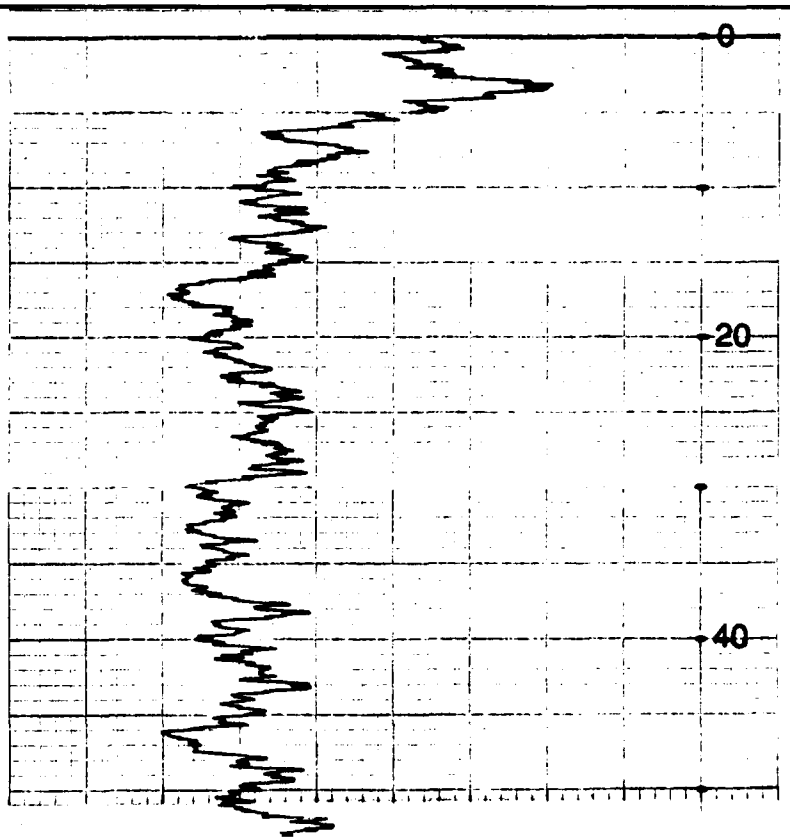
Instrument: Johnson Keck, Model SR-3000

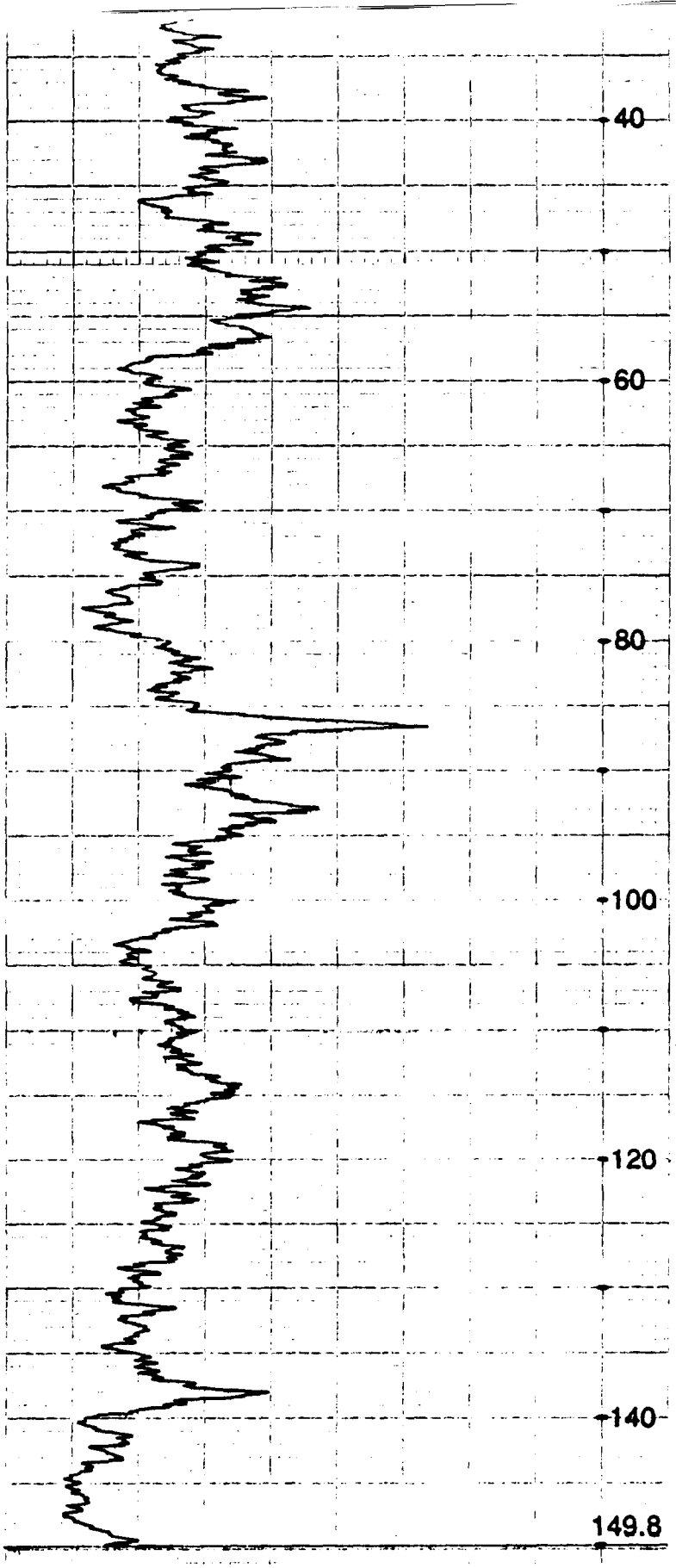
Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: ____

Scale
Counts/Minutes

200 — 2000




40
60
80
100
120
140
149.8

Well/Boring No.: MW-18
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/10/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From ___ ft. to ___ ft: Dia ___ : Material ____
From ___ ft. to ___ ft: Dia ___ : Material ____

Type of Fluid in Hole: Depth to Fluid ____ Type ____

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 147.8 ft.

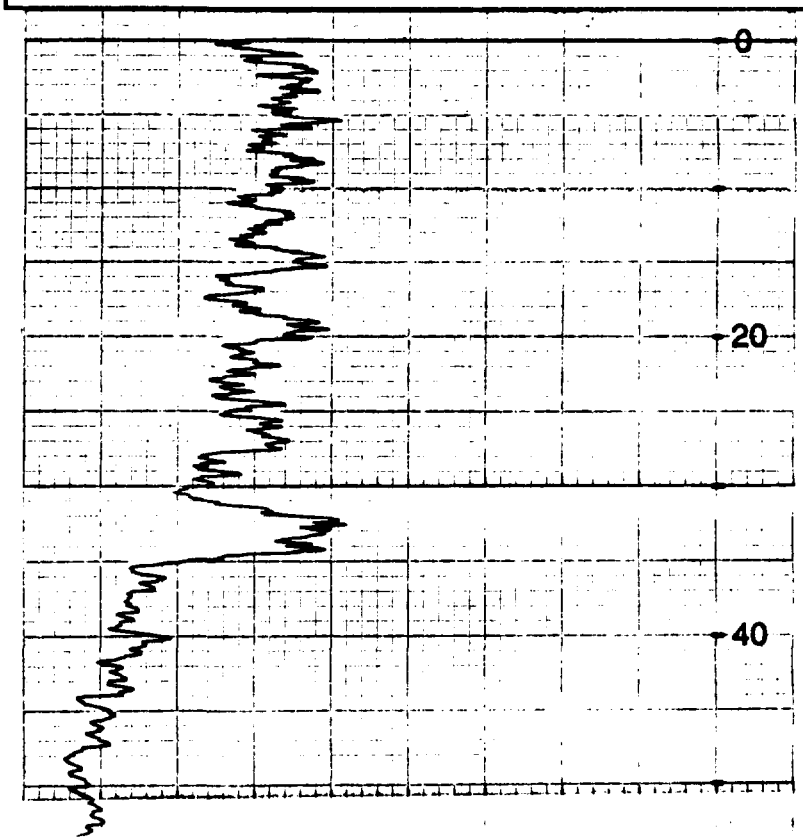
Instrument: Johnson Keck, Model SR-3000

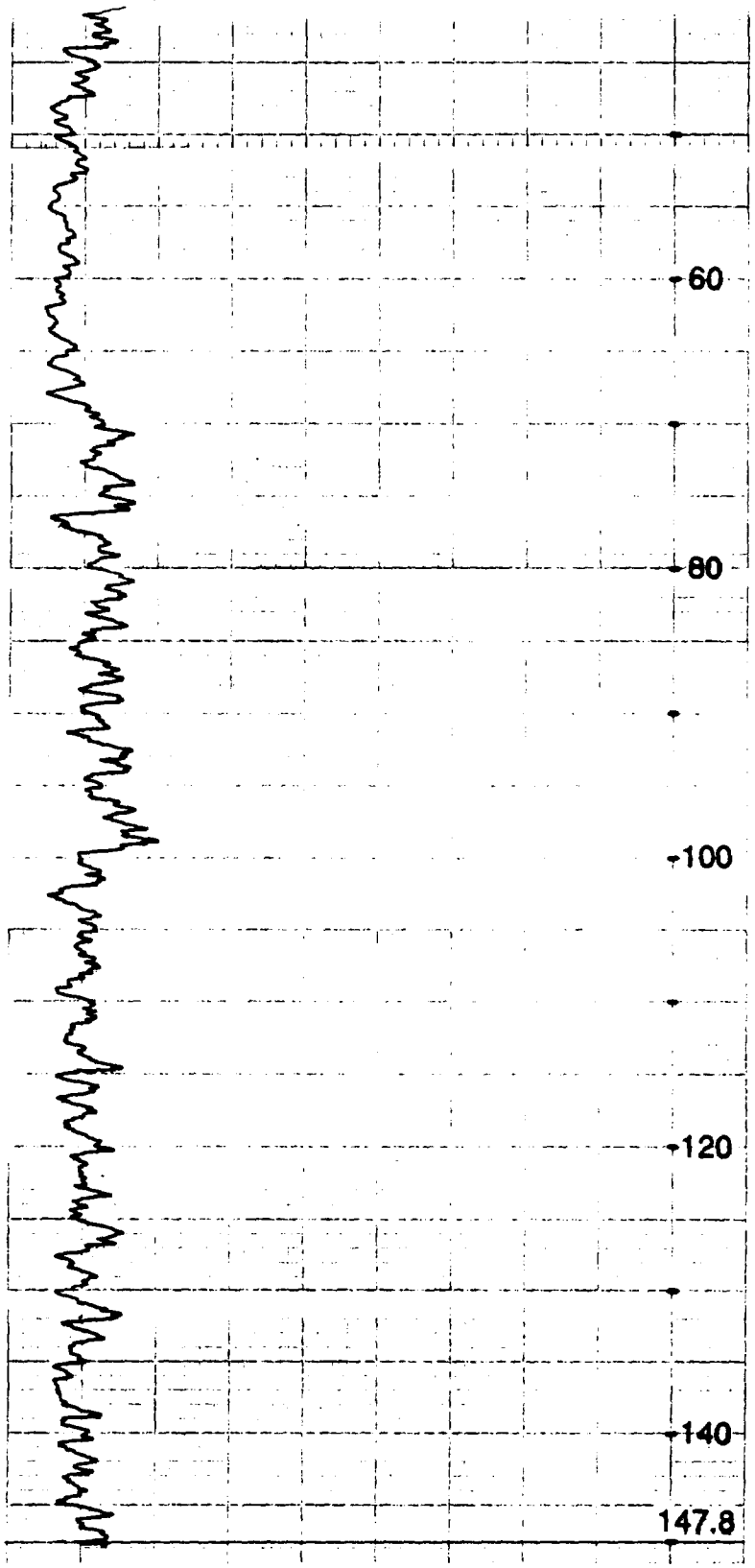
Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: ____

Scale
Counts/Minutes

200 — 2000




60
80
100
120
140
147.8

Well/Boring No.: MW-20
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/10/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From ___ ft. to ___ ft: Dia ___ : Material ____
From ___ ft. to ___ ft: Dia ___ : Material ____

Type of Fluid in Hole: Depth to Fluid ____ Type ____

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 143.5 ft.

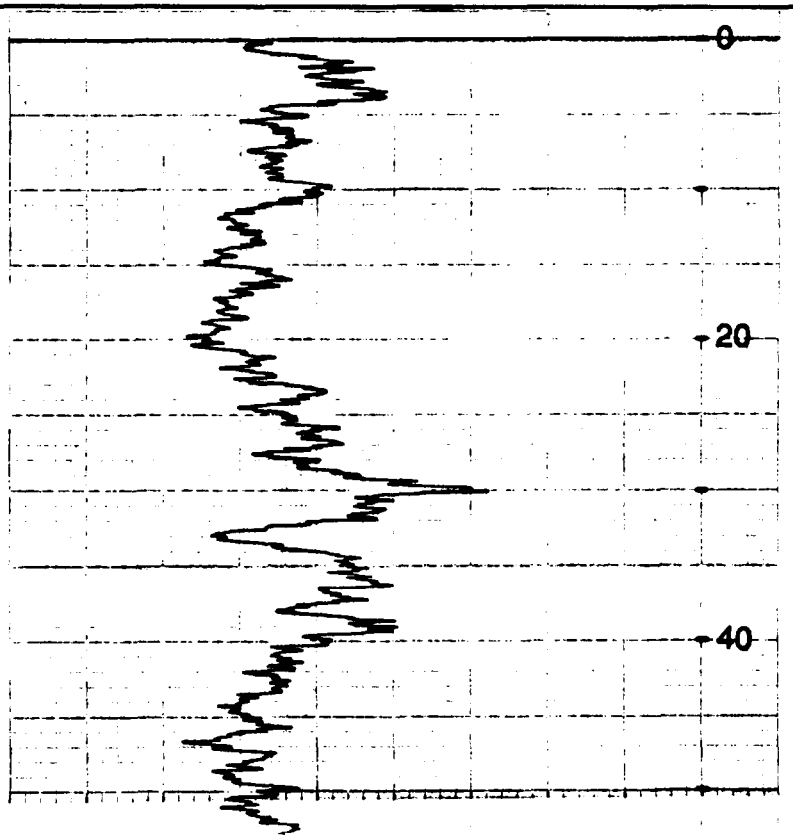
Instrument: Johnson Keck, Model SR-3000

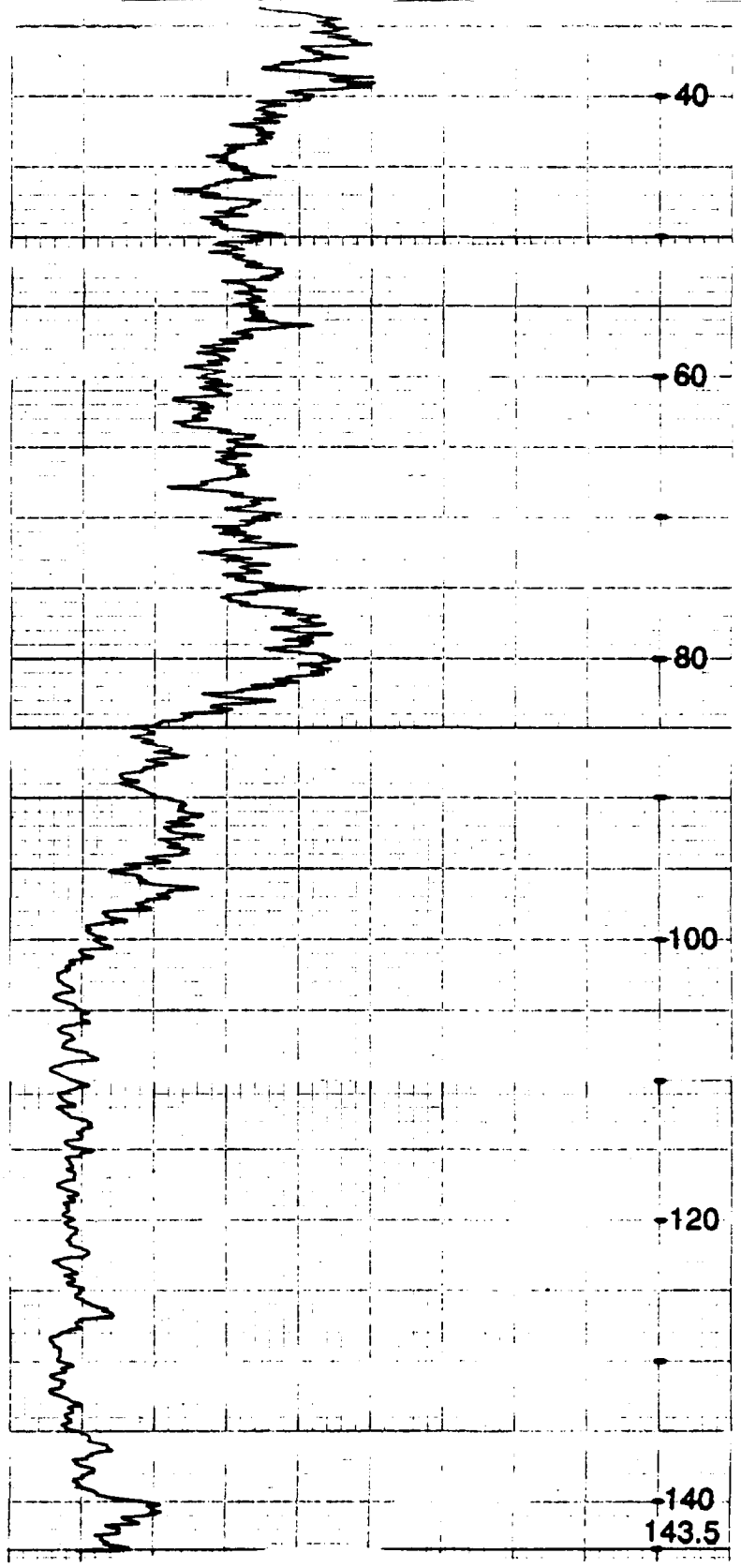
Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: ____

Scale
Counts/Minutes

200 — 2000




40
60
80
100
120
140
143.5

Well/Boring No.: MW-27
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/15/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.5 ft. to 72.5 ft: Dia 6" : Material PVC
From 72.5 ft. to 83.0 ft: Dia 6" : Material Open Hole

Type of Fluid in Hole: Depth to Fluid 26.70 Type Water

Log Datum: Ground Surface

Interval Logged: From 60 ft. to 81.1 ft.

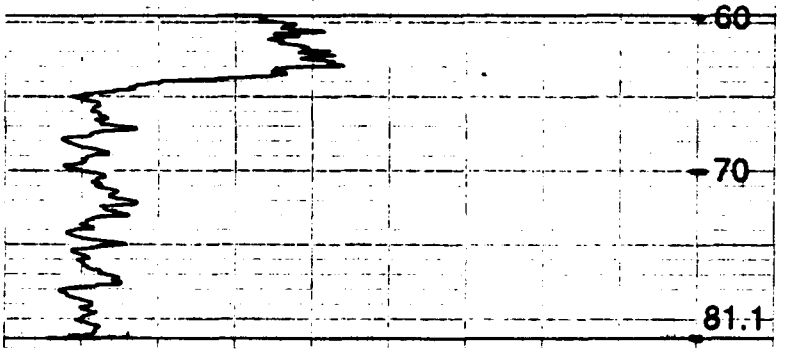
Instrument: Johnson Kec[illegible]odel SR-3000

Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: _____

Scale
Counts/Minutes

200 — 2000



Well/Boring No.: MW-27
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/8/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.5 ft. to 72.5 ft: Dia 6" : Material PVC
From 72.5 ft. to 83.0 ft: Dia 6" : Material Open Hole

Type of Fluid in Hole: Depth to Fluid 25.36 Type Water

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 70.4 ft.

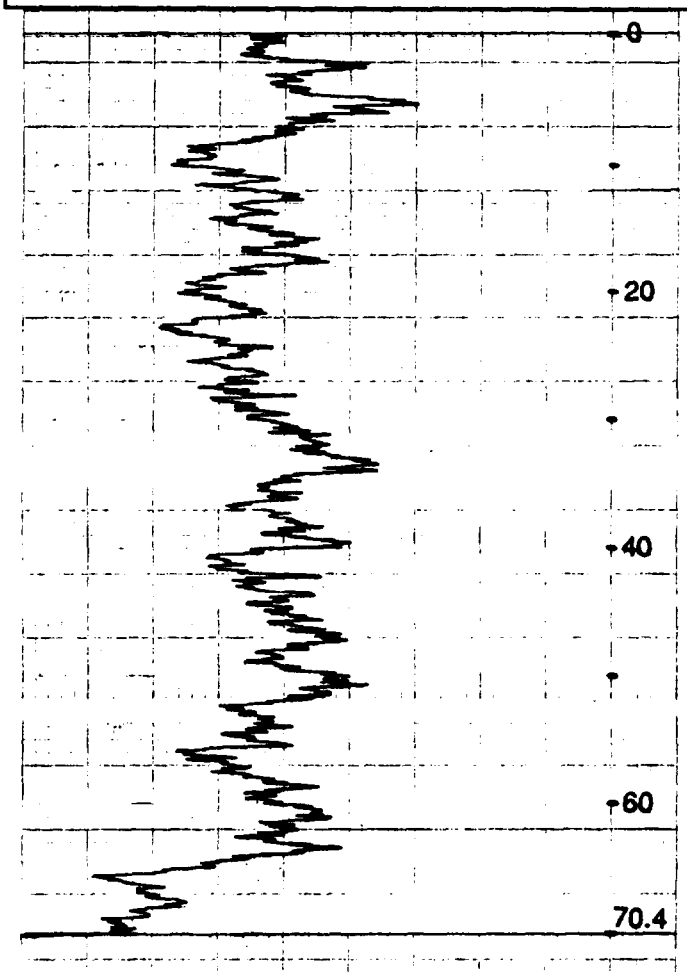
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: _____

Scale
Counts/Minutes

200 — 2000



Well/Boring No.: MW-28
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/10/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.0 ft. to 5.0 ft: Dia 6" : Material Steel
From 5.0 ft. to 97.0 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 26.70 Type Water

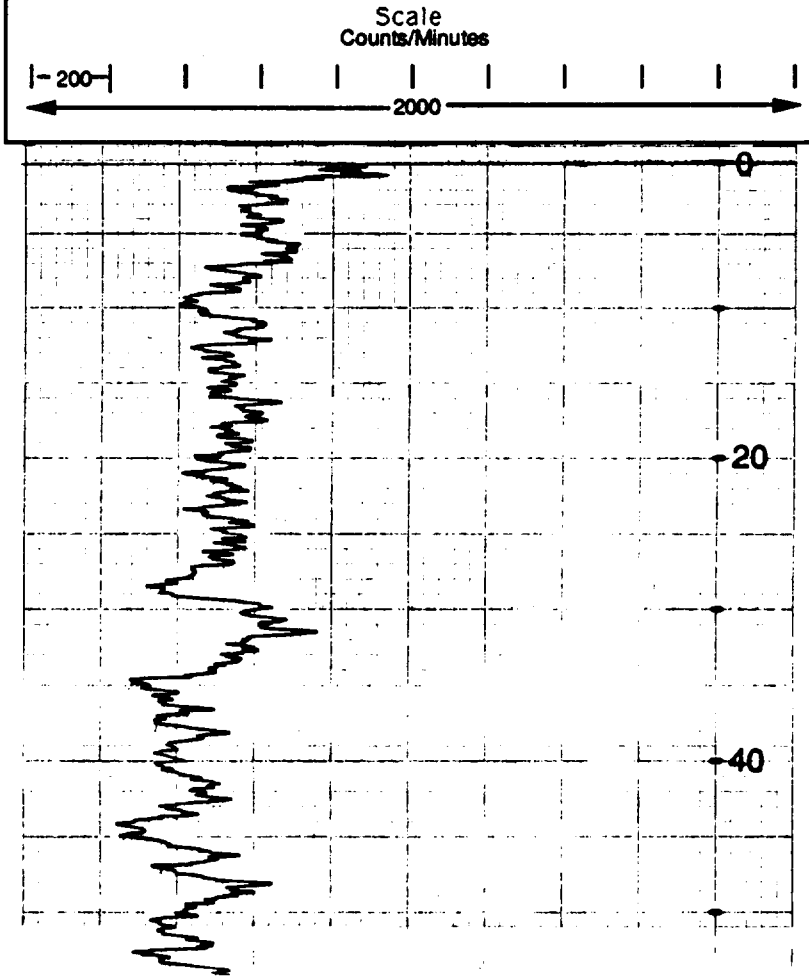
Log Datum: Ground Surface

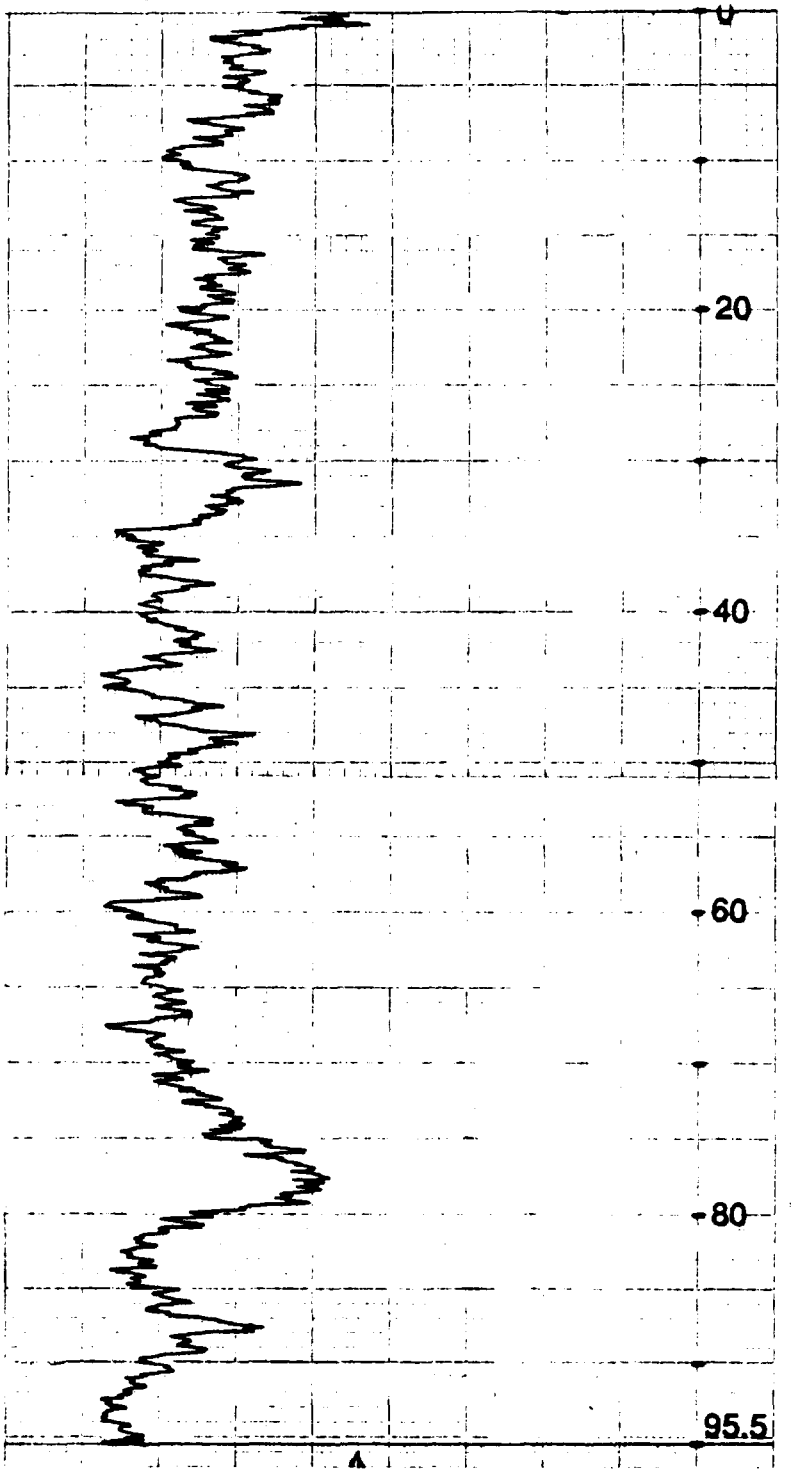
Interval Logged: From 0 ft. to 95.5 ft.

Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: _____




0
20
40
60
80
95.5

Well/Boring No.: MW-28
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/15/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From 5.0 ft. to 97.0 ft: Dia 6" : Material PVC
From 97.0 ft. to 107 ft: Dia 6" : Material Open Hole

Type of Fluid in Hole: Depth to Fluid 26.70 Type Water

Log Datum: Ground Surface

Interval Logged: From 90 ft. to 105 ft.

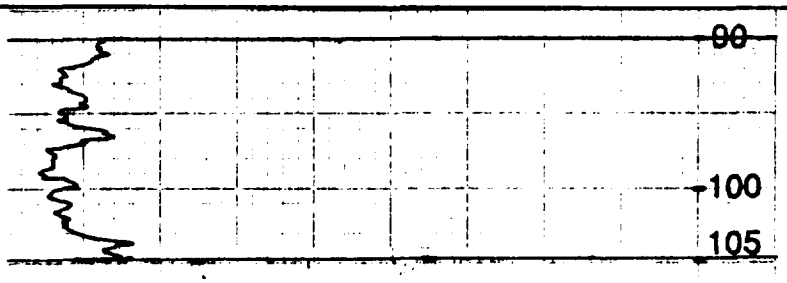
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: ____

Scale
Counts/Minutes

200 — 2000



Well/Boring No.: MW-29
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/16/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

___ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +3.0 ft. to 5.0 ft: Dia 6" : Material Steel
From 5.0 ft. to 103 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 28.17 Type Water

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 112.6 ft.

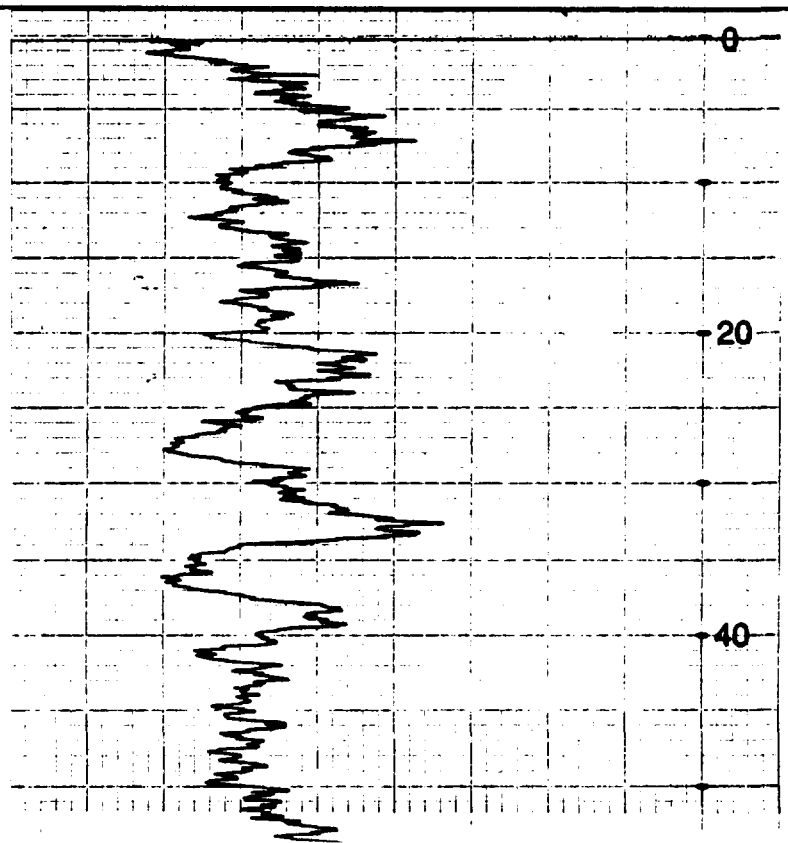
Instrument: Johnson Keck, Model SR-3000

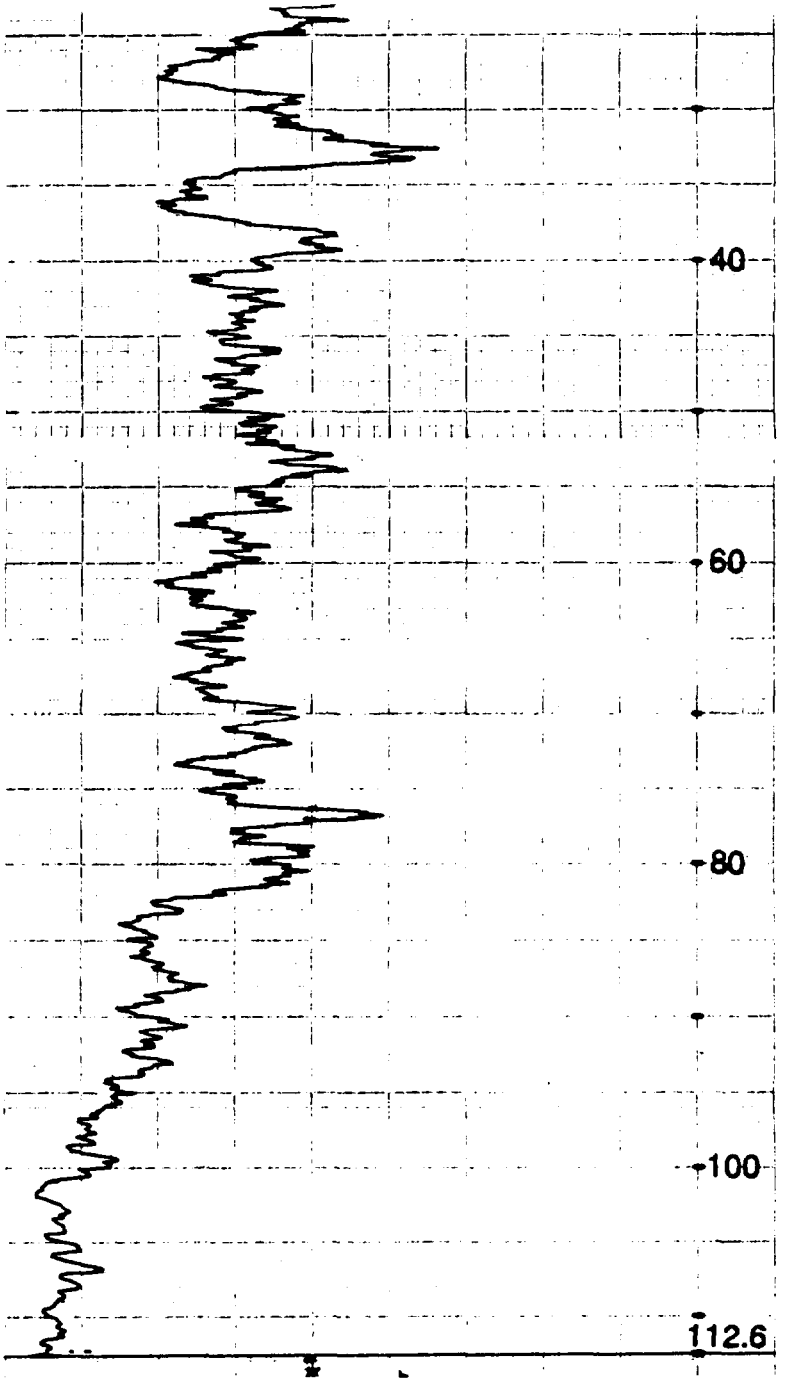
Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: _____

Scale
Counts/Minutes

200 — 2000




40
60
80
100
112.6

Well/Boring No.: MW-30
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/15/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.0 ft. to 7.0 ft: Dia 6" : Material Steel
From 7.0 ft. to 29.0 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 37.38 Type Water

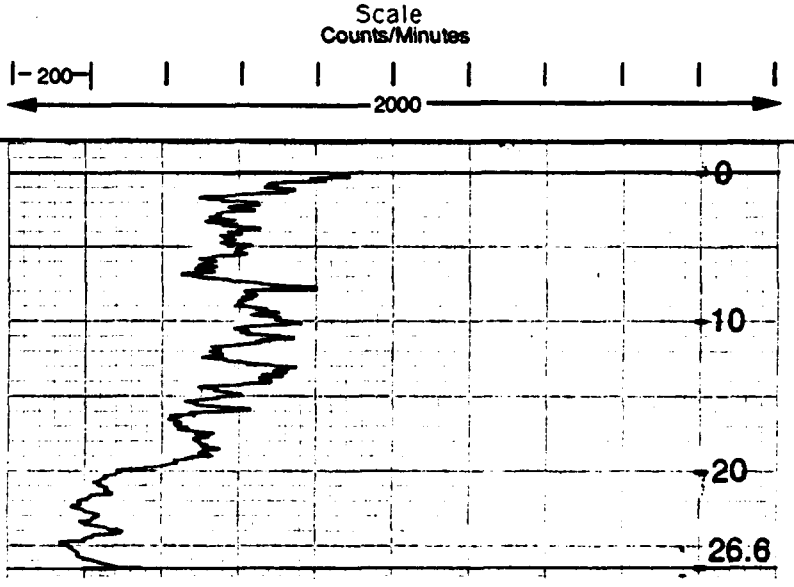
Log Datum: Ground Surface

Interval Logged: From 0 ft. to 26.6 ft.

Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: _____



Well/Boring No.: MW-30
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/17/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.0 ft. to 4.0 ft: Dia 6" : Material Steel
From 4.0 ft. to 55.0 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 35.38 Type Water

Log Datum: Ground Surface

Interval Logged: From 20 ft. to 35.9 ft.

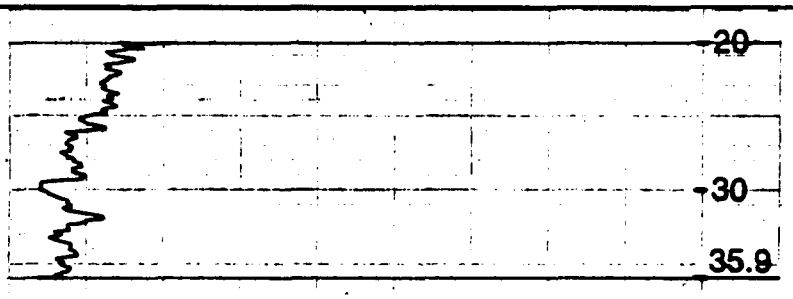
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: _____

Scale
Counts/Minutes

200 — 2000



Well/Boring No.: MW-31
Client: Sundstrand - Rockford
Project No.: 20557
Date: 11/13/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.0 ft. to 4.0 ft: Dia 6" : Material Steel
From 4.0 ft. to 55.0 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 35.38 Type Water

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 55.7 ft.

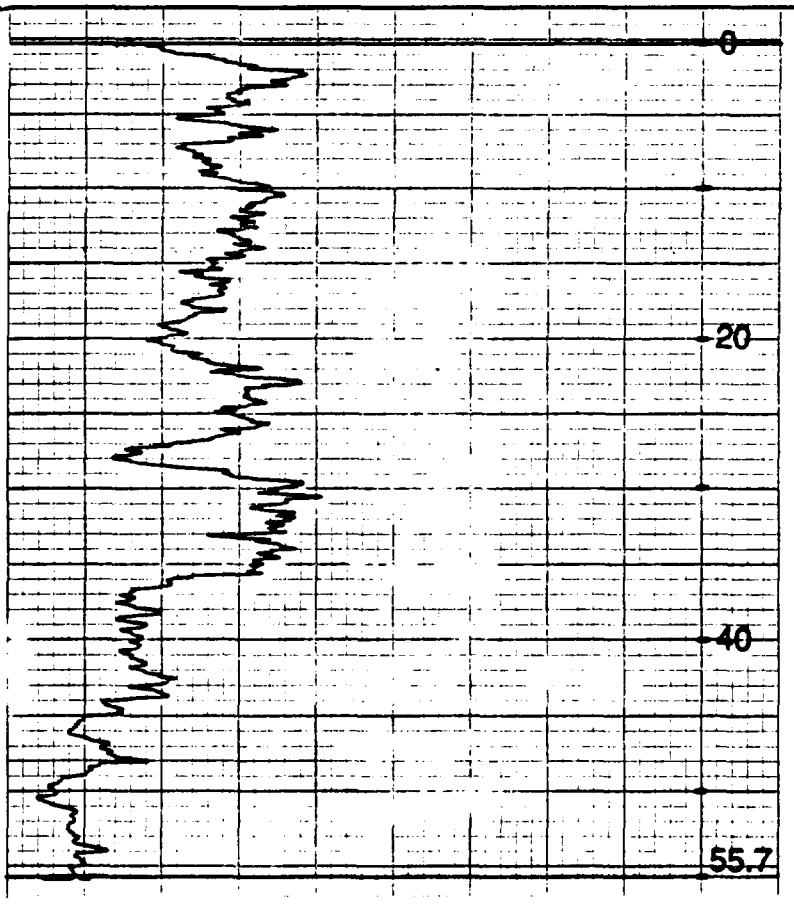
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 200
Time Constant 5 Sec

Probe: _____

Scale
Counts/Minutes

200 — 2000



Well/Boring No.: MW-32
Client: Sundstrand - Rockford
Project No.: 20557
Date: 11/11/86

Gamma Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.0 ft. to 4.0 ft: Dia 6" : Material Steel
From 4.0 ft. to 56.0 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 41.31 Type Water

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 55.1 ft.

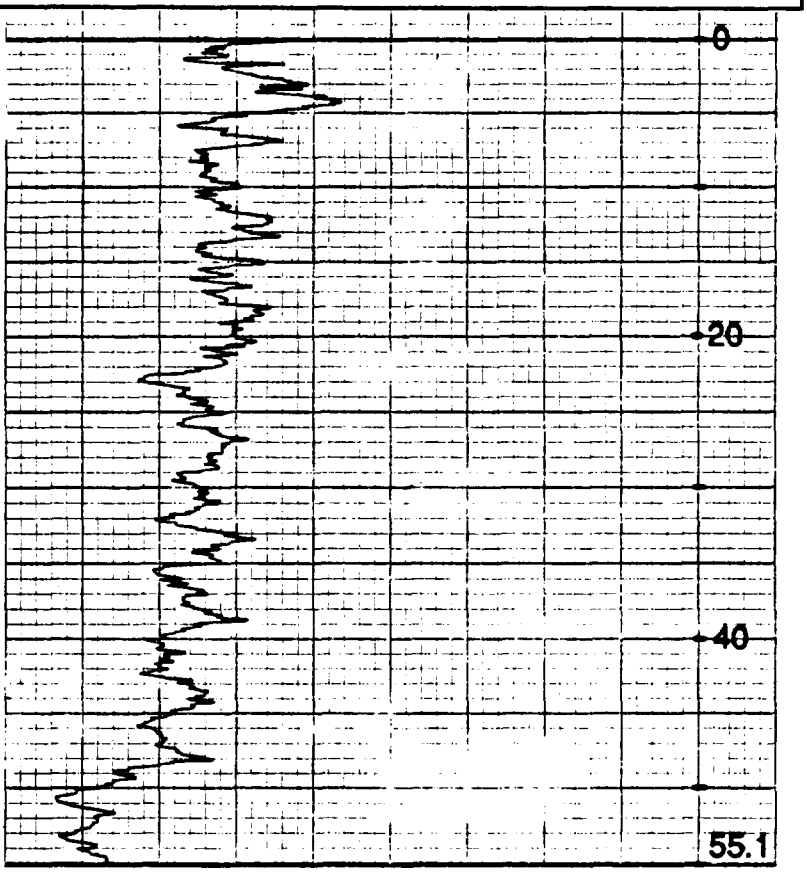
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 2.0
Module Sensitivity 100
Time Constant 5 Sec

Probe: _____

Scale
Counts/Minutes

200 — 2000



Well/Boring No.: MW-27
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/18/86

Resistivity Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.5 ft. to 72.5 ft: Dia 6" : Material PVC
From 72.5 ft. to 83.0 ft: Dia 6" : Material Open Hole

Type of Fluid in Hole: Depth to Fluid 26.70 Type Water

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 61.3 ft.

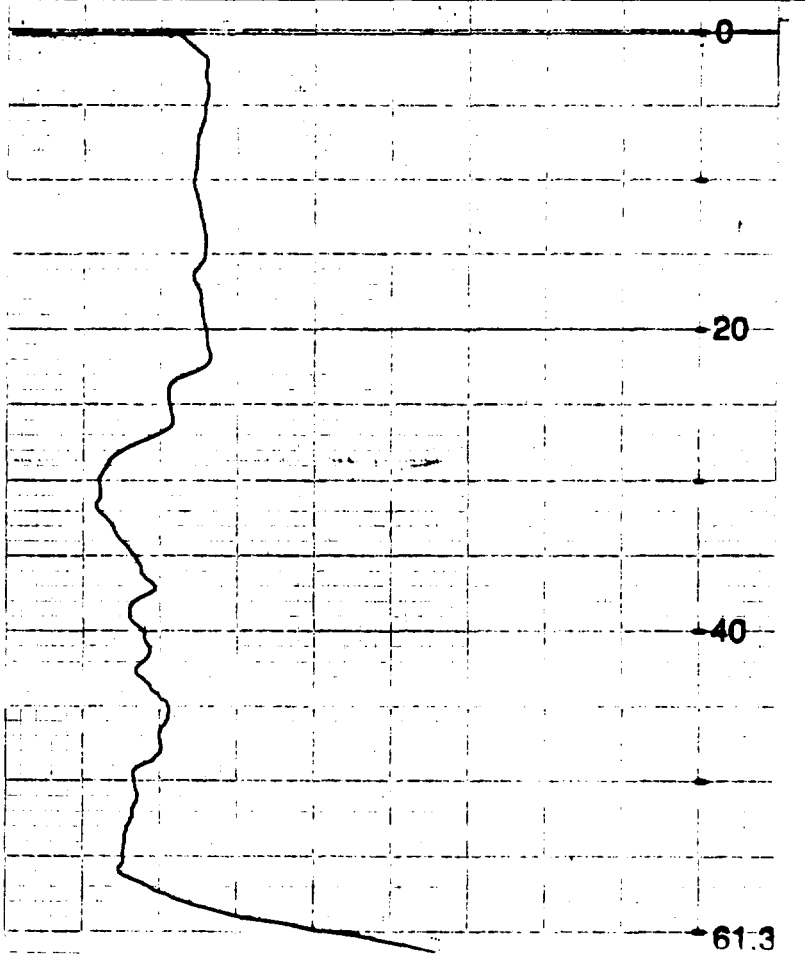
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 1.0
Module Sensitivity 50
Time Constant N/A Sec

Probe: 0.25 Normal

Scale
Ohm - Feet

50 — 500



Well/Boring No.: MW-27
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/15/86

Resistivity Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.5 ft. to 72.5 ft: Dia 6" : Material PVC
From 72.5 ft. to 83.0 ft: Dia 6" : Material Open Hole

Type of Fluid in Hole: Depth to Fluid 26.70 Type Water

Log Datum: Ground Surface

Interval Logged: From 55 ft. to 71.4 ft.

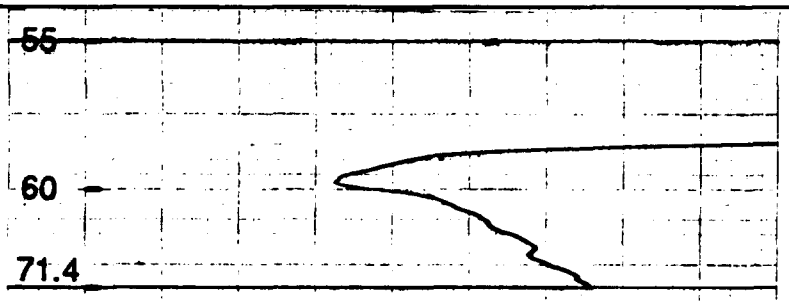
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 1.0
Module Sensitivity 50
Time Constant N/A Sec

Probe: 0.25 Normal

Scale
Ohm - Feet

50 — 500



Well/Boring No.: MW-28
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/10/86

Resistivity Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.0 ft. to 5.0 ft: Dia 6" : Material Steel
From 5.0 ft. to 97.0 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 26.70 Type Water

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 85.9 ft.

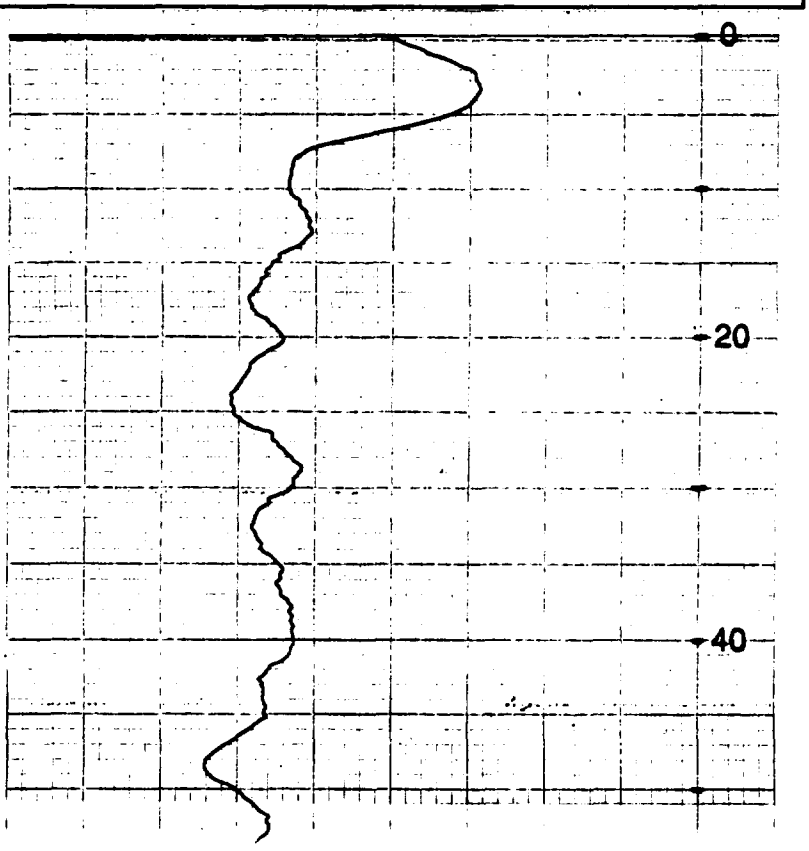
Instrument: Johnson Keck, Model SR-3000

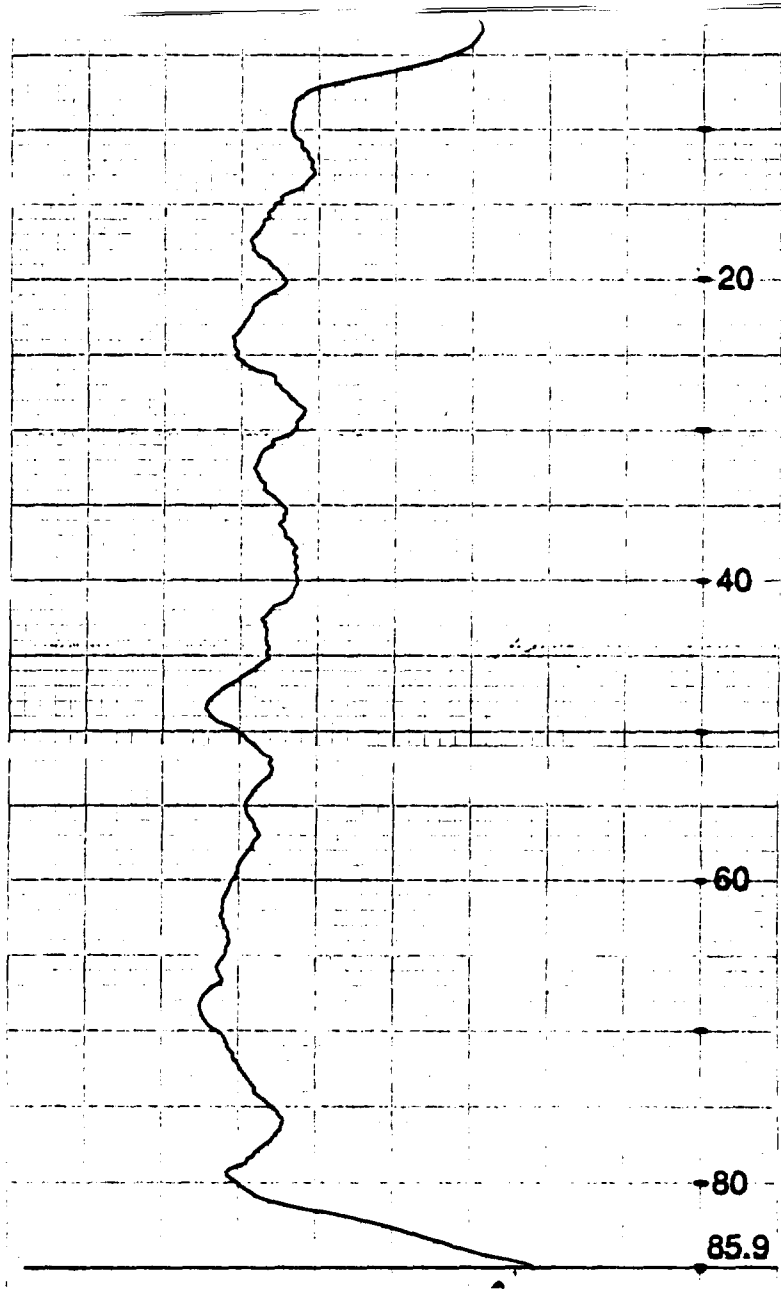
Instrument Setting:
Recorder Sensitivity 1.0
Module Sensitivity 50
Time Constant N/A Sec

Probe: 0.25 Normal

Scale
Ohm - Feet

|-50-| | | | | | | | | 500




20
40
60
80
85.9

Well/Boring No.: MW-29
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/11/86

Resistivity Log

Location: State IL County Winnebago Township City of Rockford

1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +3.0 ft. to 5.0 ft: Dia 6" : Material Steel
From 5.0 ft. to 103 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 28.17 Type Water

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 91.3 ft.

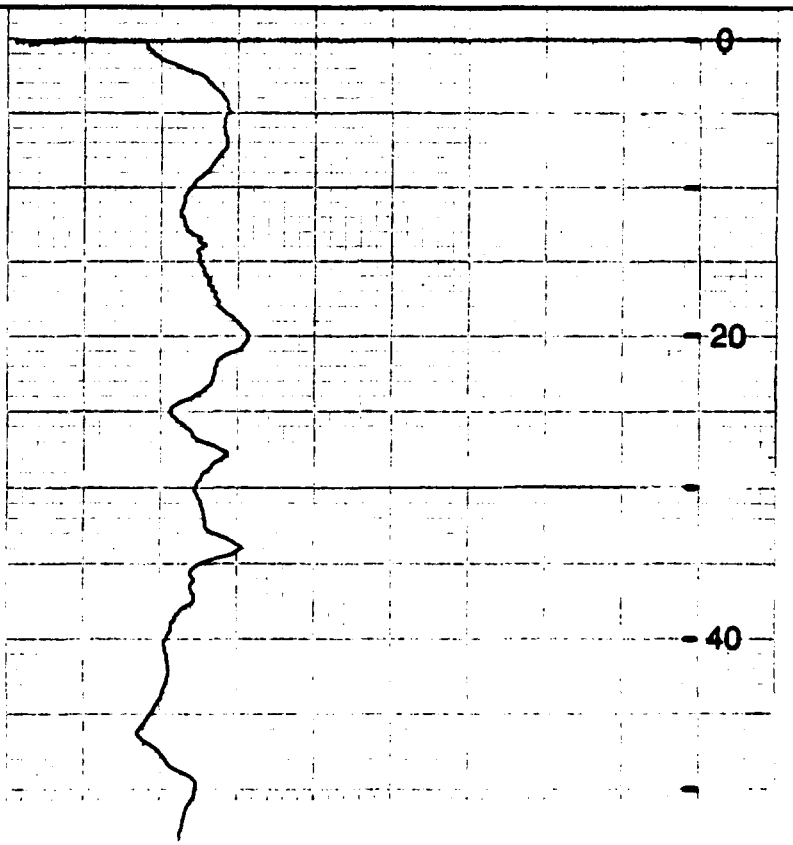
Instrument: Johnson Keck, Model SR-3000

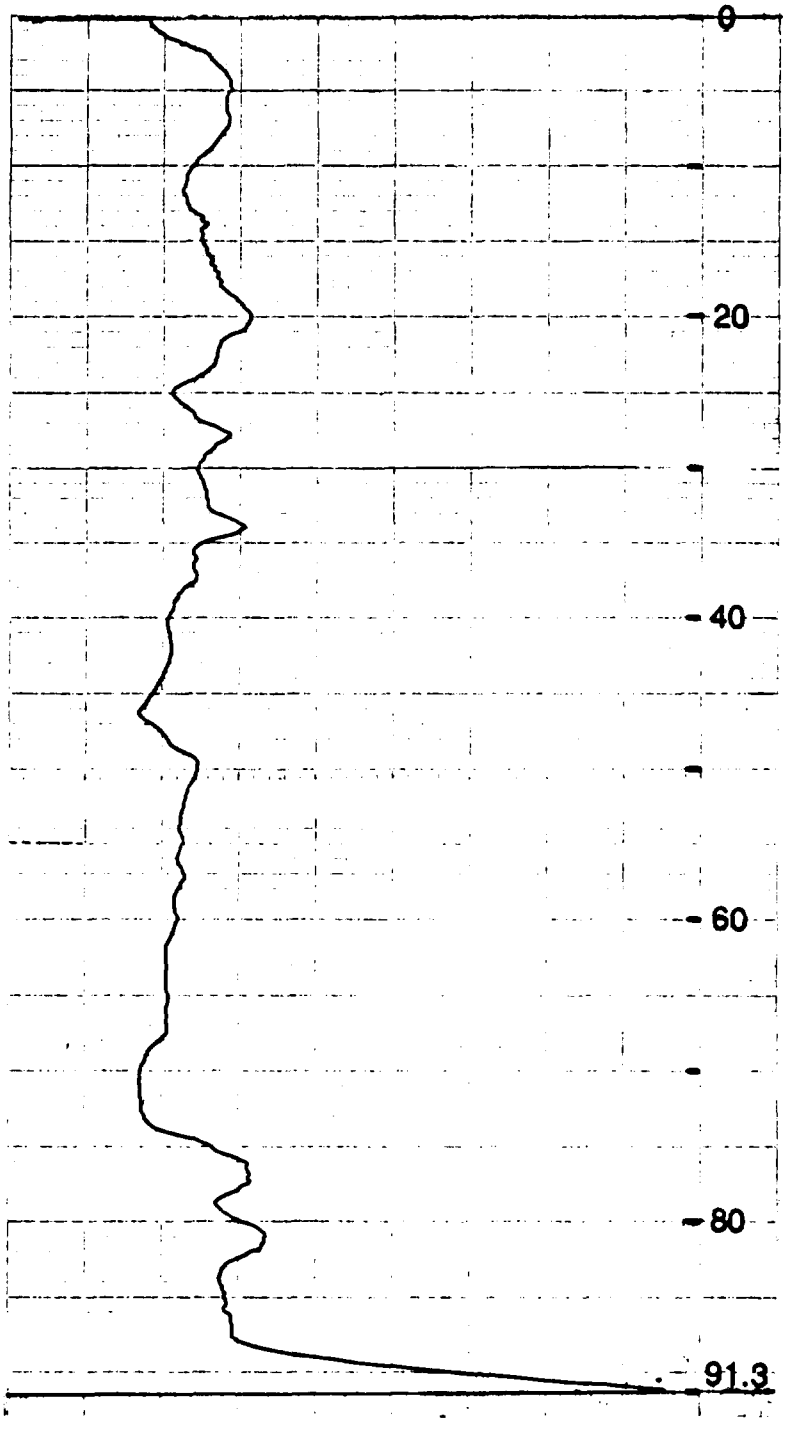
Instrument Setting:
Recorder Sensitivity 1.0
Module Sensitivity 50
Time Constant N/A Sec

Probe: 0.25 Normal

Scale
Ohm - Feet

50 — 500




0
20
40
60
80
91.3

Well/Boring No.: MW-29
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/16/86

Resistivity Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +3.0 ft. to 5.0 ft: Dia 6" : Material Steel
From 5.0 ft. to 103 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 28.17 Type Water

Log Datum: Ground Surface

Interval Logged: From 90 ft. to 104.2 ft.

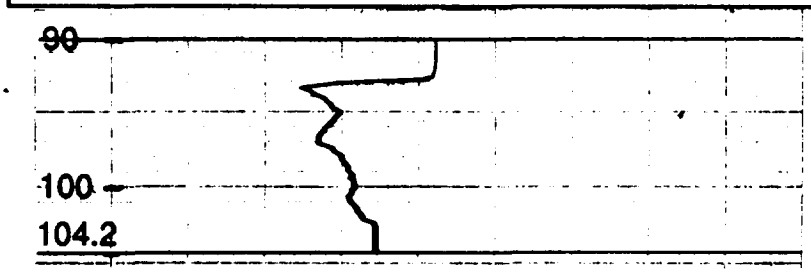
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 1.0
Module Sensitivity 50
Time Constant N/A Sec

Probe: 0.25 Normal

Scale
Ohm - Feet

50 — 500



Well/Boring No.: MW-30
Client: Sundstrand - Rockford
Project No.: 20557
Date: 4/17/86

Resistivity Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.0 ft. to 5.0 ft: Dia 6" : Material Steel
From 4.0 ft. to 55.0 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 35.38 Type Water

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 17.1 ft.

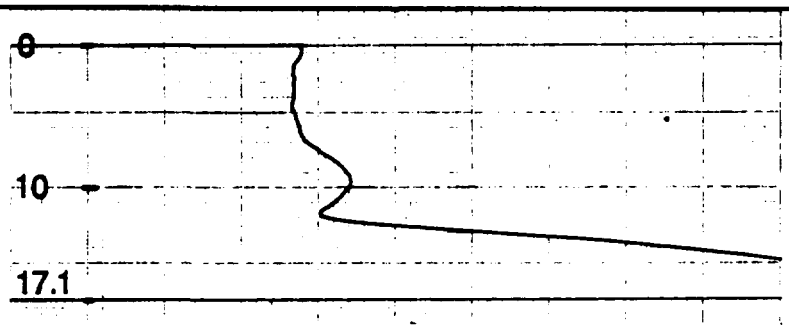
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 1.0
Module Sensitivity 50
Time Constant N/A Sec

Probe: 0.25 Normal

Scale
Ohm - Feet

50 — 500



Well/Boring No.: MW-31
Client: Sundstrand - Rockford
Project No.: 20557
Date: 11/13/86

Resistivity Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.0 ft. to 4.0 ft: Dia 6" : Material Steel
From 4.0 ft. to 55.0 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 35.38 Type Water

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 54 ft.

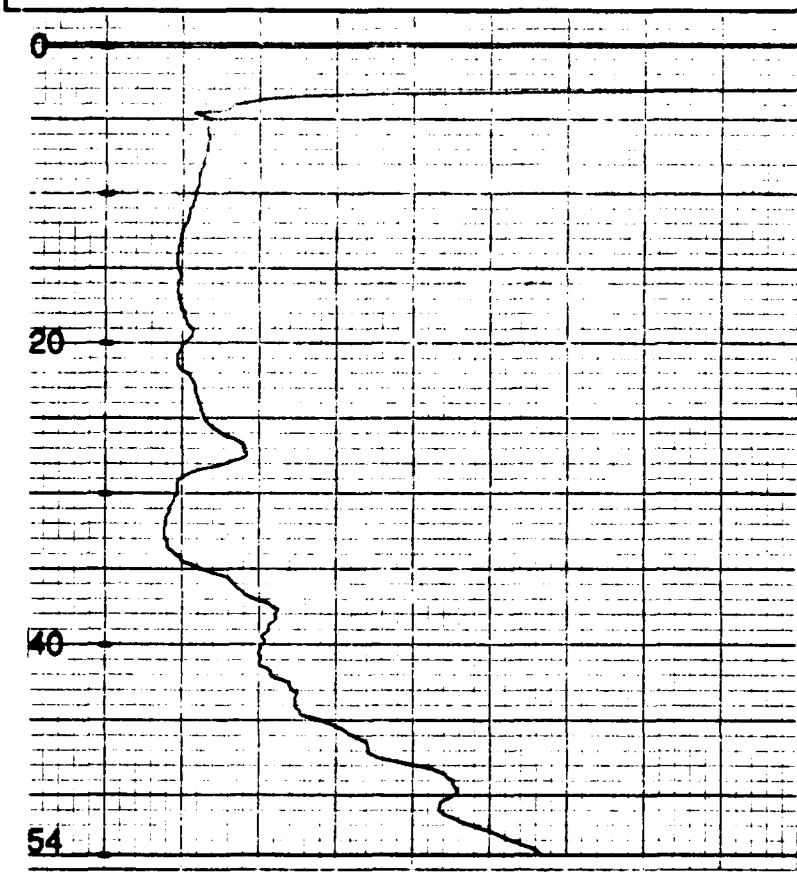
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 1.0
Module Sensitivity 50
Time Constant N/A Sec

Probe: 0.25 Normal

Scale
Ohm - Feet

|-50-| 500



Well/Boring No.: MW-32
Client: Sundstrand - Rockford
Project No.: 20557
Date: 11/11/86

Resistivity Log

Location: State IL County Winnebago Township City of Rockford

____ 1/4 NW 1/4 NE 1/4 Section 5 T 43N R 2E

Contractor EDI Engineering & Science

Type of Hole: From +2.0 ft. to 4.0 ft: Dia 6" : Material Steel
From 4.0 ft. to 56.0 ft: Dia 6" : Material PVC

Type of Fluid in Hole: Depth to Fluid 41.31 Type Water

Log Datum: Ground Surface

Interval Logged: From 0 ft. to 53.7 ft.

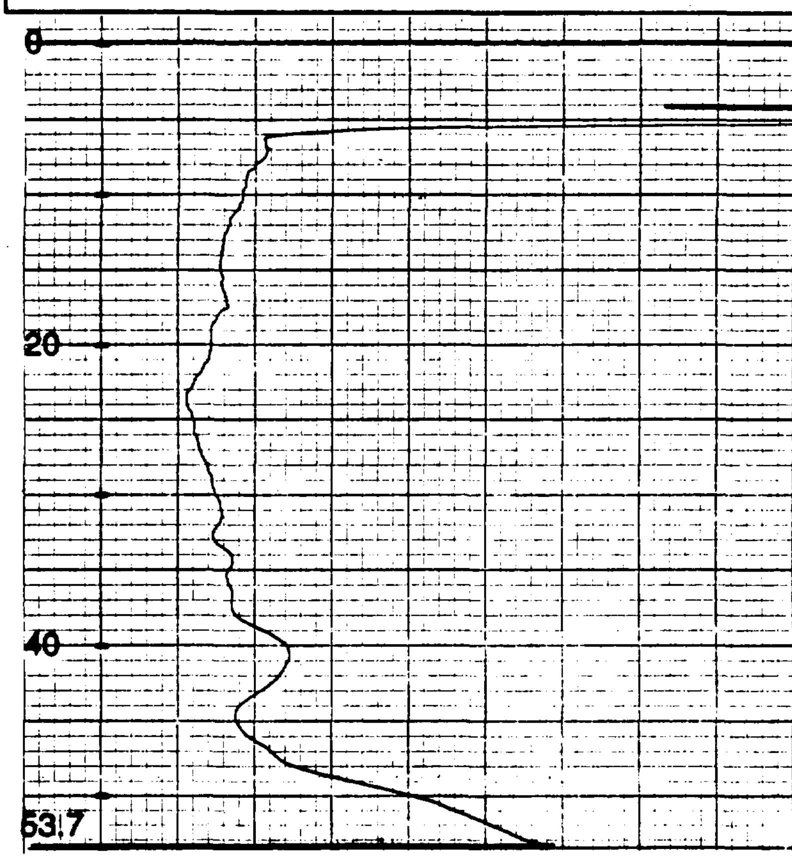
Instrument: Johnson Keck, Model SR-3000

Instrument Setting:
Recorder Sensitivity 1.0
Module Sensitivity 50
Time Constant N/A Sec

Probe: 0.25 Normal

Scale
Ohm - Feet

|-50-| 500



APPENDIX B
RESULTS OF AQUIFER TESTING

RESULTS OF AQUIFER TESTING

AQUIFER TEST USING PW-3

Boulton (1963) developed a widely used method for evaluating aquifer tests in unconfined aquifers. The assumptions underlying this method are:

1. The aquifer is infinite in an areal extent.
2. The aquifer is homogeneous, isotropic, and of uniform thickness.
3. The water table is horizontal before pumping begins.
4. Pumping is continuous at a constant rate.
5. The pumped well fully penetrates the aquifer and water flows horizontally to the entire length of the well screen.
6. Flow to the well is in an unsteady state.
7. The aquifer is unconfined and shows delayed yield phenomena.
8. The diameter of the well is small (i.e., well storage can be neglected).

The aquifer at the Sundstrand Plant and the well construction features do not completely satisfy these conditions. Important assumptions not met are assumptions 2 and 5. As in most pumping tests, the aquifer is not homogeneous or isotropic, and the pumped well does not fully penetrate the aquifer.

Analysis of test data is accomplished by a curve matching procedure. Log-log plots of drawdown versus time for each observation well are matched to one of a series of "well function of Boulton" curves and match points used to solve:

$$S = \frac{Q}{4T} W(u,r/B)$$

Where:

$$u = \frac{r^2 S}{4Tt}$$

	Q =	Well discharge (2.8 ft^3/min for this test)
	T =	Aquifer transmissivity
W(u,r/B)	=	Well function of Boulton
	r =	Distance from pumped well to observation well
	S =	Coefficient of storage ("early time") match point data only) or specific yield ("late time" match point data only)
	t =	Time

Figures B-1 and B-2 illustrate the curve matches selected for this analysis for monitoring wells MW-9 and MW-31. Other matches are possible, but the illustrated plots result in a transmissivity value consistant with the values expected for this aquifer. Thus, the estimated transmissivity is 611 ft^2/day for data from MW-9 and 908 $feet^2$/day for data from MW-31. MW-18 was evaluated in the same manner but the evaluation resulted in a T of 53 ft^2/day which is too low and is probably due to the fact that this well is much deeper than PW-3.

Storage coefficient calculated from these values result in unreasonable values which may be the result of the short test period.

Water level data obtained during this test is summarized at the end of this Appendix.

EVALUATION USING CLOSED CONTOUR METHOD

The cone of depression determined from data obtained in the fall of 1986 near PW-1 and PW-2 were evaluated by a method described by Lohman. The method requires two closed contours surrounding a known groundwater withdrawal.

The equation is:

$$T = -\frac{2Q}{(L_1 + L_2)\, h/r}$$

where:

T = Transmissivity
Q = Well discharge (19.6 gpm, 2.6 ft^3/min)
L_1 = Length of contour 1 (575 feet)
L_2 = Length of contour 2 (275 feet)
h = Head difference between contours (1 foot)
r = Average distance between closed contours (50 feet)

The results of this evaluation is a transmissivity of 470 ft^2/day.

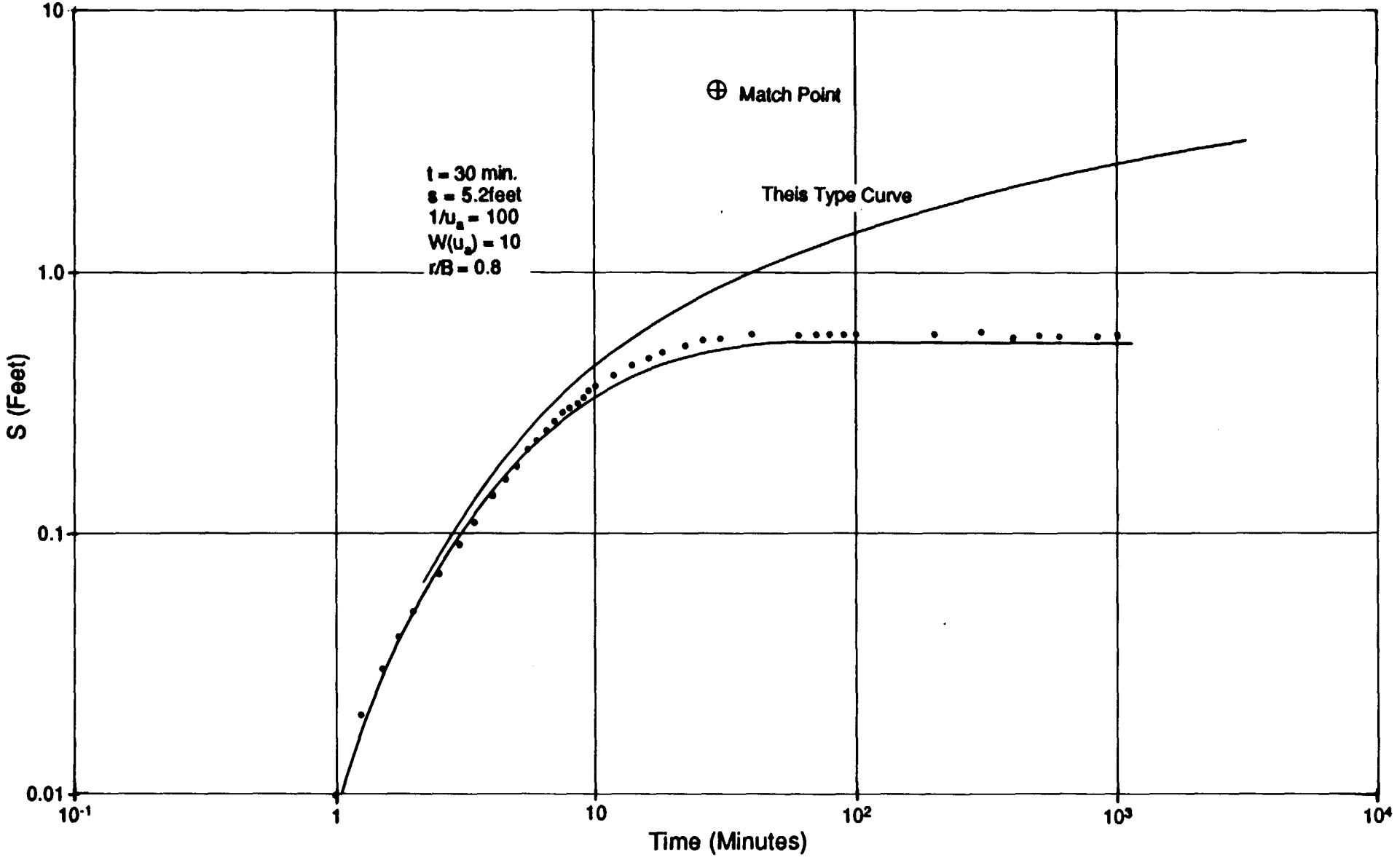


Figure B-1 Curve Matching for Data from MW-9

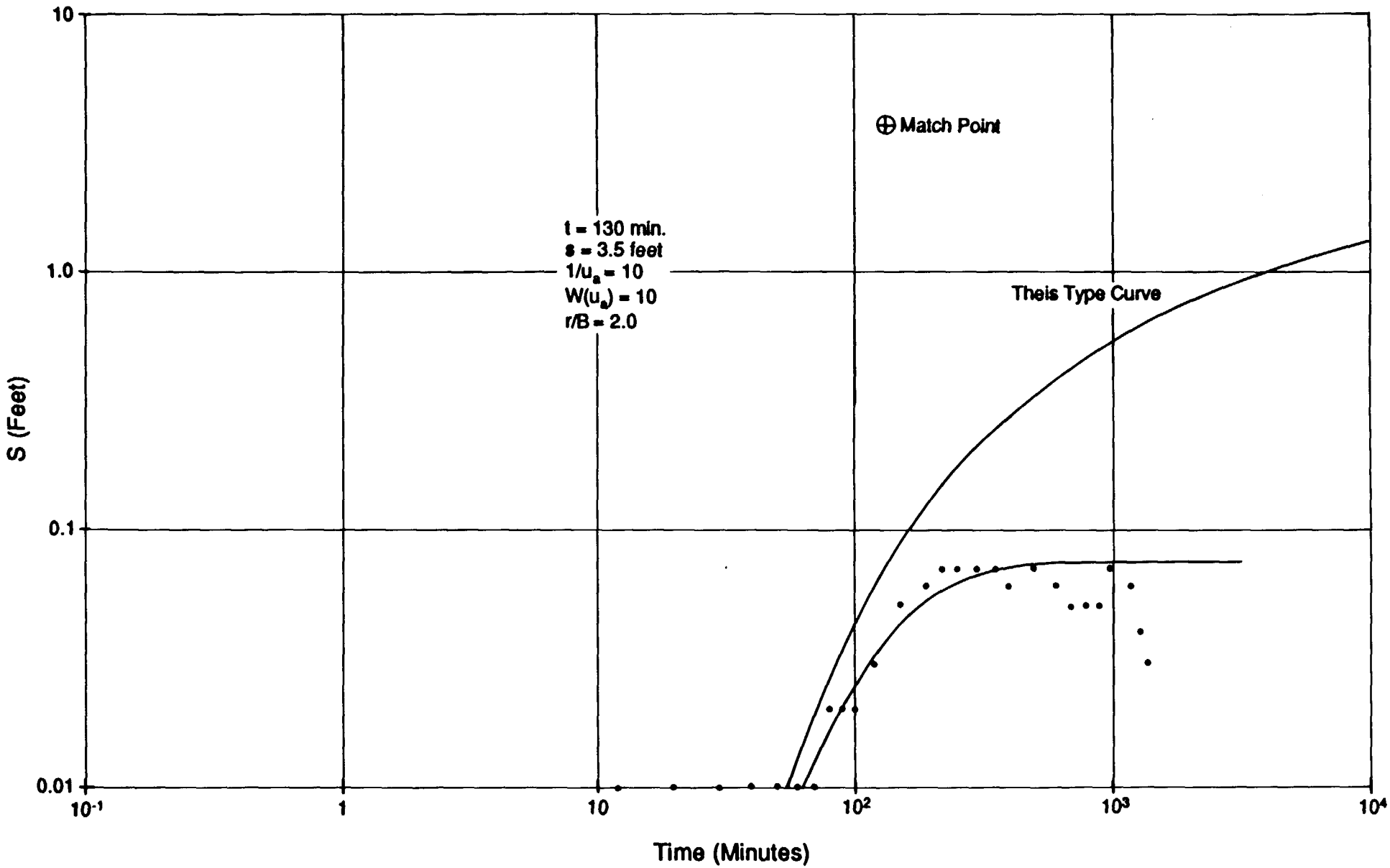


Figure B-2 Curve Matching for Data from MW-31

APPENDIX C

RESULTS OF CHEMICAL ANALYSES

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD *DATE SAMPLED: 02/10/87 TIME: 5:10 PM*
PROJECT NO.: 25687 *DATE RECEIVED: 02/12/87 TIME: 6:10 PM*
SAMPLE: 1 *DATE COMPLETED: 021687*
PW-3 AQUIFER TEST

SAMPLE NO. 71297

COMPOUND	*RESULT (mg/l)*	*D.L.*	*COMPOUND*	*RESULT (mg/l)*	*D.L.*
BENZENE	*	*0.001*	*TRANS-1,2-DICHLOROETHYLENE*	*	*0.002*
BROMODICHLOROMETHANE	*	*0.002*	*1,2-DICHLOROPROPANE*	*	*0.003*
BROMOFORM	*	*0.015*	*CIS-1,3-DICHLOROPROPYLENE*	*	*0.004*
BROMOMETHANE	*	*0.010*	*TRANS-1,3-DICHLOROPROPYLENE*	*	*0.004*
CARBON TETRACHLORIDE	*	*0.004*	*ETHYL BENZENE*	*	*0.001*
CHLOROBENZENE	*	*0.001*	*METHYLENE CHLORIDE*	*	*0.002*
CHLORODIBROMOMETHANE	*	*0.003*	*1,1,2,2-TETRACHLOROETHANE*	*	*0.002*
CHLOROETHANE	*	*0.010*	*TETRACHLOROETHYLENE*	*0.006*	*0.002*
2-CHLOROETHYLVINYL ETHER	*	*0.010*	*TOLUENE*	*	*0.001*
CHLOROFORM	*	*0.001*	*1,1,1-TRICHLOROETHANE*	*0.092*	*0.002*
CHLOROMETHANE	*	*0.010*	*1,1,2-TRICHLOROETHANE*	*	*0.003*
1,1-DICHLOROETHANE	*	*0.002*	*TRICHLOROETHYLENE*	*0.010*	*0.002*
1,2-DICHLOROETHANE	*	*0.002*	*TRICHLOROFLUOROMETHANE*	*	*0.003*
1,1-DICHLOROETHYLENE	*0.013*	*0.002*	*VINYL CHLORIDE*	*	*0.010*

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: 2
PW-3 AQUIFER TEST

DATE SAMPLED: 02/10/87 TIME: 9:55 AM
DATE RECEIVED: 02/12/87 TIME: 6:10 PM
DATE COMPLETED: 021687

SAMPLE NO. 71298

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.010	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.13	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	0.013	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.015	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy. SE; Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: 3
PW-3 AQUIFER TEST

DATE SAMPLED: 02/11/87 TIME: 9:30 AM
DATE RECEIVED: 02/12/87 TIME: 6:10 PM
DATE COMPLETED: 021687

SAMPLE NO. 71299

COMPOUND	*RESULT (mg/l)*	*D.L.*	*COMPOUND*	*RESULT (mg/l)*	*D.L.*
BENZENE	*	*0.001*	*TRANS-1,2-DICHLOROETHYLENE*	*	*0.002*
BROMODICHLOROMETHANE	*	*0.002*	*1,2-DICHLOROPROPANE*	*	*0.003*
BROMOFORM	*	*0.015*	*CIS-1,3-DICHLOROPROPYLENE*	*	*0.004*
BROMOMETHANE	*	*0.010*	*TRANS-1,3-DICHLOROPROPYLENE*	*	*0.004*
CARBON TETRACHLORIDE	*	*0.004*	*ETHYL BENZENE*	*	*0.001*
CHLOROBENZENE	*	*0.001*	*METHYLENE CHLORIDE*	*	*0.002*
CHLORODIBROMOMETHANE	*	*0.003*	*1,1,2,2-TETRACHLOROETHANE*	*0.013*	*0.002*
CHLOROETHANE	*	*0.010*	*TETRACHLOROETHYLENE*	*	*0.002*
2-CHLOROETHYLVINYL ETHER	*	*0.010*	*TOLUENE*	*0.16*	*0.001*
CHLOROFORM	*	*0.001*	*1,1,1-TRICHLOROETHANE*	*	*0.002*
CHLOROMETHANE	*	*0.010*	*1,1,2-TRICHLOROETHANE*	*0.014*	*0.003*
1,1-DICHLOROETHANE	*	*0.002*	*TRICHLOROETHYLENE*	*	*0.002*
1,2-DICHLOROETHANE	*	*0.002*	*TRICHLOROFLUOROMETHANE*	*	*0.003*
1,1-DICHLOROETHYLENE	*0.020*	*0.002*	*VINYL CHLORIDE*	*	*0.010*

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: 4
PW-3 AQUIFER TEST

DATE SAMPLED: 02/11/87 TIME: 12:25 PM
DATE RECEIVED: 02/12/87 TIME: 6:10 PM
DATE COMPLETED: 021687

SAMPLE NO. 71300

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.013	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.17	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	0.015	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.019	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD *DATE SAMPLED: 02/11/87 TIME: 2:45 PM*
PROJECT NO.: 25687 *DATE RECEIVED: 02/12/87 TIME: 6:10 PM*
SAMPLE: 5 *DATE COMPLETED: 021687*
PW-3 AQUIFER TEST

SAMPLE NO. 71301

COMPOUND	*RESULT (mg/l)*	*D.L.*	*COMPOUND*	*RESULT (mg/l)*	*D.L.*
BENZENE	*	*0.001*	*TRANS-1,2-DICHLOROETHYLENE*	*	*0.002*
BROMODICHLOROMETHANE	*	*0.002*	*1,2-DICHLOROPROPANE*	*	*0.003*
BROMOFORM	*	*0.015*	*CIS-1,3-DICHLOROPROPYLENE*	*	*0.004*
BROMOMETHANE	*	*0.010*	*TRANS-1,3-DICHLOROPROPYLENE*	*	*0.004*
CARBON TETRACHLORIDE	*	*0.004*	*ETHYL BENZENE*	*	*0.001*
CHLOROBENZENE	*	*0.001*	*METHYLENE CHLORIDE*	*	*0.002*
CHLORODIBROMOMETHANE	*	*0.003*	*1,1,2,2-TETRACHLOROETHANE*	*	*0.002*
CHLOROETHANE	*	*0.010*	*TETRACHLOROETHYLENE*	*0.004*	*0.002*
2-CHLOROETHYLVINYL ETHER	*	*0.010*	*TOLUENE*	*0.002*	*0.001*
CHLOROFORM	*	*0.001*	*1,1,1-TRICHLOROETHANE*	*0.052*	*0.002*
CHLOROMETHANE	*	*0.010*	*1,1,2-TRICHLOROETHANE*	*	*0.003*
1,1-DICHLOROETHANE	*	*0.002*	*TRICHLOROETHYLENE*	*0.005*	*0.002*
1,2-DICHLOROETHANE	*	*0.002*	*TRICHLOROFLUOROMETHANE*	*	*0.003*
1,1-DICHLOROETHYLENE	*0.006*	*0.002*	*VINYL CHLORIDE*	*	*0.010*

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE; Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
EDI LABORATORY REPORT

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
LOCATION: ROCKFORD, ILLINOIS
SAMPLED BY: ELC
DESCRIPTION: GROUNDWATER ANALYSIS

DATE SAMPLED: 00/00/00 TIME:
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 05/09/86
SCHEDULED COMPLETION: 5/12/86
ANALYST: CS,MB,NJB
QUALITY CONTROL REVIEW BY: DEK
WORKSHEET NO: 1

	MW #6	MW #9	MW #14	MW #16	DETECTION LIMIT	UNITS
EDI SAMPLE NO:	61809	61810	61811	61812		
BICARBONATE	230	150	170	290	2.0	mg/l
CHLORIDE	27	16	106	6.1	1.0	mg/l
HARDNESS(as CaCO3)	350	220	280	360		mg/l
GREASE&OIL/FREON-EXT	1.7	1.7	1.5	1.8	1.0	mg/l
pH VALUE	7.96	8.46	8.49	7.74		std. units
RESIDUE,DISSOLVED	370	250	430	340	1.0	mg/l
SULFATE	61	39	38	25	5.0	mg/l
TOC	<5	<5	<5	5	5	mg/l

ANALYSIS BY STANDARD METHODS 16TH EDITION AND/OR METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, USEPA, 1983.

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE, Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
EDI LABORATORY REPORT

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
LOCATION: ROCKFORD, ILLINOIS
SAMPLED BY: ELC
DESCRIPTION: GROUNDWATER ANALYSIS

DATE SAMPLED: 00/00/00 TIME:
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 05/09/86
SCHEDULED COMPLETION: 5/12/86
ANALYST: CS,MB,NJB
QUALITY CONTROL REVIEW BY: DEK
WORKSHEET NO: 3

	MW #17	MW #21	MW #27	MW #30	DETECTION LIMIT	UNITS
EDI SAMPLE NO:	61813	61814	61815	61816		
BICARBONATE	320	170	360	24	2.0	mg/l
CHLORIDE	5.2	15	130	32	1.0	mg/l
HARDNESS(as CaCO3)	390	240	530	69	1.0	mg/l
GREASE&OIL/FREON-EXT	1.7	1.9	1.5	2.4	1.0	mg/l
pH VALUE	7.63	8.50	7.49	10.93		std. units
RESIDUE,DISSOLVED	400	280	780	470	1.0	mg/l
SULFATE	67	67	56	38	5.0	mg/l
TOC	<5	<5	<5	<5	5	mg/l

ANALYSIS BY STANDARD METHODS 16TH EDITION AND/OR METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, USEPA, 1983.

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE; Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD *DATE SAMPLED: 04/17/86 TIME: 4:15 PM*
PROJECT NO.: 25687 *DATE RECEIVED: 04/21/86 TIME: 8:00 AM*
SAMPLE: MW #6 *DATE COMPLETED: 04/28/86*

SAMPLE NO. 61809

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.098	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.27	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	0.029	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.045	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #7

DATE SAMPLED: 04/17/86 TIME: 7:05 PM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/28/86

SAMPLE NO. 61817

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	0.001	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #7

DATE SAMPLED: 11/12/86 TIME: 4:35 PM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111786

SAMPLE NO. 69095

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.001
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE, Grand Rapids, MI 49506-2179, (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #8

DATE SAMPLED: 04/17/86 TIME: 5:00 PM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/28/86

SAMPLE NO. 61818

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.015	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #9

DATE SAMPLED: 04/17/86 TIME: 6:45 PM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/28/86

SAMPLE NO. 61810

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	0.002	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.023	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.36	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	0.002	0.002	TRICHLOROETHYLENE	0.038	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.049	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#9

DATE SAMPLED: 11/12/86 TIME: 4:50 PM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111886

SAMPLE NO. 69096

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	0.008	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.10	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	1.4	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	0.008	0.002	TRICHLOROETHYLENE	0.14	0.002
1,2-DICHLOROETHANE	0.004	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.20	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #10

DATE SAMPLED: 04/17/86 TIME: 3:40 PM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/25/86

SAMPLE NO. 61819

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	0.001	0.001	TRANS-1,2-DICHLOROETHYLENE	0.009	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.14	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	2.1	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	0.006	0.002	TRICHLOROETHYLENE	0.16	0.002
1,2-DICHLOROETHANE	0.003	0.002	TRICHLOROFLUOROMETHANE	0.004	0.003
1,1-DICHLOROETHYLENE	0.33	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #10

DATE SAMPLED: 11/13/86 TIME: 5:20 PM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111886

SAMPLE NO. 69097

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	0.008	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.12	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	0.001	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	1.6	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	0.006	0.002	TRICHLOROETHYLENE	0.13	0.002
1,2-DICHLOROETHANE	0.003	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.31	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#11

DATE SAMPLED: 11/13/86 TIME: 4:40 PM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111886

SAMPLE NO. 69098

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.006	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.13	0.002
CHLOROMETHANE	*	0:010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	0.006	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.011	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #12

DATE SAMPLED: 04/18/86 TIME: 7:10 AM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/25/86

SAMPLE NO. 61820

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #13

DATE SAMPLED: 04/18/86 TIME: 7:20 AM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/25/86

SAMPLE NO. 61821

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	0.002	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #14

DATE SAMPLED: 04/18/86 TIME: 7:45 AM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/28/86

SAMPLE NO. 61811

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #16

DATE SAMPLED: 04/17/86 TIME: 3:15 PM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/28/86

SAMPLE NO. 61812

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	0.001	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #16

DATE SAMPLED: 11/14/86 TIME: 1:15 PM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111786

SAMPLE NO. 69099

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #17

DATE SAMPLED: 04/17/86 TIME: 5:33 PM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/28/86

SAMPLE NO. 61813

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE, Grand Rapids, MI 49506-2179, (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #18

DATE SAMPLED: 04/17/86 TIME: 6:55 PM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/25/86

SAMPLE NO. 61822

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE; Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#18

DATE SAMPLED: 11/12/86 TIME: 1:15 PM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111886

SAMPLE NO. 69100

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #19

DATE SAMPLED: 04/17/86 TIME: 10:20 AM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/25/86

SAMPLE NO. 61823

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	0.002	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #19

DATE SAMPLED: 11/12/86 TIME: 3:05 PM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111886

SAMPLE NO. 69101

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #20

DATE SAMPLED: 04/17/86 TIME: 10:40 AM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/25/86

SAMPLE NO. 61824

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	0.001	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.002	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#20

DATE SAMPLED: 11/17/86 TIME: 12:35 PM
DATE RECEIVED: 11/21/86 TIME: 2:15 PM
DATE COMPLETED: 112586

SAMPLE NO. 69300

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.007	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #21

DATE SAMPLED: 04/17/86 TIME: 5:50 PM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/28/86

SAMPLE NO. 61814

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.024	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	0.009	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE; Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#21

DATE SAMPLED: 11/14/86 TIME: 8:40 AM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111786

SAMPLE NO. 69102

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	0.003	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	0.011	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.031	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.001
1,1-DICHLOROETHANE	0.013	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.002	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #22

DATE SAMPLED: 04/17/86 TIME: 6:00 PM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/25/86

SAMPLE NO. 61825

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0,010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
811 Cascade W Pkwy, SE, Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#22

DATE SAMPLED: 11/14/86 TIME: 10:35 AM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111886

SAMPLE NO. 69103

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#22 (DUP)

DATE SAMPLED: 11/14/86 TIME: 10:35 AM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111786

SAMPLE NO. 69104

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD *DATE SAMPLED: 04/17/86 TIME: 8:50 AM*
PROJECT NO.: 25687 *DATE RECEIVED: 04/21/86 TIME: 8:00 AM*
SAMPLE: MW #27 *DATE COMPLETED: 04/28/86*

SAMPLE NO. 61815

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #28

DATE SAMPLED: 04/17/86 TIME: 1:00 PM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/25/86

SAMPLE NO. 61826

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#28

DATE SAMPLED: 11/17/86 TIME: 3:00 PM
DATE RECEIVED: 11/21/86 TIME: 2:15 PM
DATE COMPLETED: 112586

SAMPLE NO. 69301

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#28A

DATE SAMPLED: 11/18/86 TIME: 5:10 PM
DATE RECEIVED: 11/21/86 TIME: 2:15 PM
DATE COMPLETED: 112686

SAMPLE NO. 69302

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.048	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.002	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy. SE, Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#28B

DATE SAMPLED: 11/18/86 TIME: 4:35 PM
DATE RECEIVED: 11/21/86 TIME: 2:15 PM
DATE COMPLETED: 112686

SAMPLE NO. 69303

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE, Grand Rapids, MI 49506-2179: (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #29

DATE SAMPLED: 04/17/86 TIME: 10:30 AM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/25/86

SAMPLE NO. 61827

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	0.001	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy. SE; Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#29

DATE SAMPLED: 11/17/86 TIME: 11:55 PM
DATE RECEIVED: 11/21/86 TIME: 2:15 PM
DATE COMPLETED: 112586

SAMPLE NO. 69304

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE; Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW #30

DATE SAMPLED: 04/17/86 TIME: 8:35 AM
DATE RECEIVED: 04/21/86 TIME: 8:00 AM
DATE COMPLETED: 04/28/86

SAMPLE NO. 61816

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE; Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#30

DATE SAMPLED: 11/12/86 TIME: 4:00 PM
DATE RECEIVED: 11/15/86 TIME: 2:00 PM
DATE COMPLETED: 111886

SAMPLE NO. 69105

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	0.001	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#31A DUP.

DATE SAMPLED: 11/20/86 TIME: 9:30 AM
DATE RECEIVED: 11/21/86 TIME: 2:15 PM
DATE COMPLETED: 112686

SAMPLE NO. 69307

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.002	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.048	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.003	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

EDI Engineering & Science
Environmental Engineering, Geology, Biology & Chemistry
611 Cascade W Pkwy, SE; Grand Rapids, MI 49506-2179; (616) 942-9600
a subsidiary of WW Engineering & Science

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#32

DATE SAMPLED: 11/21/86 TIME: 7:20 AM
DATE RECEIVED: 11/21/86 TIME: 2:15 PM
DATE COMPLETED: 112586

SAMPLE NO. 69308

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.005	TRANS-1,2-DICHLOROETHYLENE	0.017	0.010
BROMODICHLOROMETHANE	*	0.010	1,2-DICHLOROPROPANE	*	0.015
BROMOFORM	*	0.075	CIS-1,3-DICHLOROPROPYLENE	*	0.020
BROMOMETHANE	*	0.050	TRANS-1,3-DICHLOROPROPYLENE	*	0.020
CARBON TETRACHLORIDE	*	0.020	ETHYL BENZENE	*	0.005
CHLOROBENZENE	*	0.005	METHYLENE CHLORIDE	*	0.010
CHLORODIBROMOMETHANE	*	0.015	1,1,2,2-TETRACHLOROETHANE	*	0.010
CHLOROETHANE	*	0.050	TETRACHLOROETHYLENE	0.27	0.010
2-CHLOROETHYLVINYL ETHER	*	0.050	TOLUENE	*	0.005
CHLOROFORM	*	0.005	1,1,1-TRICHLOROETHANE	3.0	0.010
CHLOROMETHANE	*	0.050	1,1,2-TRICHLOROETHANE	*	0.015
1,1-DICHLOROETHANE	0.013	0.010	TRICHLOROETHYLENE	0.59	0.010
1,2-DICHLOROETHANE	*	0.010	TRICHLOROFLUOROMETHANE	*	0.015
1,1-DICHLOROETHYLENE	*	0.010	VINYL CHLORIDE	*	0.050

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#32A

DATE SAMPLED: 11/21/86 TIME: 7:40 AM
DATE RECEIVED: 11/21/86 TIME: 2:15 PM
DATE COMPLETED: 112686

SAMPLE NO. 69309

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.005	TRANS-1,2-DICHLOROETHYLENE	*	0.010
BROMODICHLOROMETHANE	*	0.010	1,2-DICHLOROPROPANE	*	0.015
BROMOFORM	*	0.075	CIS-1,3-DICHLOROPROPYLENE	*	0.020
BROMOMETHANE	*	0.050	TRANS-1,3-DICHLOROPROPYLENE	*	0.020
CARBON TETRACHLORIDE	*	0.020	ETHYL BENZENE	*	0.005
CHLOROBENZENE	*	0.005	METHYLENE CHLORIDE	*	0.010
CHLORODIBROMOMETHANE	*	0.015	1,1,2,2-TETRACHLOROETHANE	*	0.010
CHLOROETHANE	*	0.050	TETRACHLOROETHYLENE	0.14	0.010
2-CHLOROETHYLVINYL ETHER	*	0.050	TOLUENE	*	0.005
CHLOROFORM	*	0.005	1,1,1-TRICHLOROETHANE	0.97	0.010
CHLOROMETHANE	*	0.050	1,1,2-TRICHLOROETHANE	*	0.015
1,1-DICHLOROETHANE	*	0.010	TRICHLOROETHYLENE	0.10	0.010
1,2-DICHLOROETHANE	*	0.010	TRICHLOROFLUOROMETHANE	*	0.015
1,1-DICHLOROETHYLENE	0.11	0.010	VINYL CHLORIDE	*	0.050

*COMPOUND NOT PRESENT AT DETECTION LIMIT

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#31

DATE SAMPLED: 11/20/86 TIME: 9:10 AM
DATE RECEIVED: 11/21/86 TIME: 2:15 PM
DATE COMPLETED: 112586

SAMPLE NO. 69305

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.019	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

**COMPOUND NOT PRESENT AT DETECTION LIMIT*

ANALYTICAL SERVICES
PRIORITY POLLUTANT ANALYSIS

TABLE 1
VOLATILE FRACTION

CLIENT: SUNDSTRAND/ROCKFORD
PROJECT NO.: 25687
SAMPLE: MW#31A

DATE SAMPLED: 11/20/86 TIME: 9:30 AM
DATE RECEIVED: 11/21/86 TIME: 2:15 PM
DATE COMPLETED: 112686

SAMPLE NO. 69306

COMPOUND	RESULT (mg/l)	D.L.	COMPOUND	RESULT (mg/l)	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.002	0.002
2-CHLOROETHYLVINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.049	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	0.003	0.002	VINYL CHLORIDE	*	0.010

*COMPOUND NOT PRESENT AT DETECTION LIMIT

aqualab inc.

3548 35th Street, Rockford, Illinois 61109 815/874-2171

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

05-11-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Received: 04-29-88

53803 Influent Well #1 04-28-88 1100

VOLATILE COMPOUNDS		
trans-1,2-Dichloroethene	<50.	ug/l
Tetrachloroethene	220.	ug/l
Toluene	65.	ug/l
1,1,1-Trichloroethane	2,900.	ug/l
Trichloroethene	335.	ug/l

53804 Influent Well #2 04-28-88 1100

VOLATILE COMPOUNDS		
trans-1,2-Dichloroethene	<5000.	ug/l
Tetrachloroethene	<5000.	ug/l
Toluene	45,500.	ug/l
1,1,1-Trichloroethane	29,500.	ug/l
Trichloroethene	<5000.	ug/l

Tony Gartner, Manager
Rockford Division

aqualab inc.

3548 35th Street, Rockford, Illinois 61109 815/874-2171

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

05-11-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Received: 04-29-88

53805 Influent Well #3 04-28-88 1100

VOLATILE COMPOUNDS		
trans-1,2-Dichloroethene	<1.0	ug/l
Tetrachloroethene	13.	ug/l
Toluene	<1.0	ug/l
1,1,1-Trichloroethane	114.	ug/l
Trichloroethene	19.	ug/l

53806 Influent Combined 04-28-88 1100

VOLATILE COMPOUNDS		
trans-1,2-Dichloroethene	<500.	ug/l
Tetrachloroethene	<500.	ug/l
Toluene	5,750.	ug/l
1,1,1-Trichloroethane	6,000.	ug/l
Trichloroethene	600.	ug/l

Tomi Gartner, Manager
Rockford Division

aqualab inc.

3548 35th Street, Rockford, Illinois 61109 815/874-2171

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

05-11-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Received: 04-29-88

53807 Effluent 04-28-88 1100

VOLATILE COMPOUNDS		
trans-1,2-Dichloroethene	<1.0	ug/l
Tetrachloroethene	<1.0	ug/l
Toluene	<1.0	ug/l
1,1,1-Trichloroethane	3.6	ug/l
Trichloroethene	<1.0	ug/l

Toni Gartner, Manager
Rockford Division

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

07-29-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Received: 07-12-88 1220

55409 Influent Well #1 07-12-88 0830

VOLATILE		ug/l
trans-1,2-Dichloroethene	<50.	ug/l
Tetrachloroethene	240.	ug/l
Toluene	150.	ug/l
1,1,1-Trichloroethane	2,250.	ug/l
Trichloroethene	310.	ug/l

55410 Influent Well #2 07-12-88 0830

VOLATILE		ug/l
trans-1,2-Dichloroethene	<5000.	ug/l
Tetrachloroethene	<5000.	ug/l
Toluene	76,500.	ug/l
1,1,1-Trichloroethane	38,500.	ug/l
Trichloroethene	<5000.	ug/l

Toni Gartner, Manager
Rockford Division

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

07-29-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Received: 07-12-88 1220

55411 Influent Well #3 07-12-88 0830

VOLATILE		ug/l
trans-1,2-Dichloroethene	<50.	ug/l
Tetrachloroethene	85.	ug/l
Toluene	585.	ug/l
1,1,1-Trichloroethane	880.	ug/l
Trichloroethene	110.	ug/l

55412 Influent Combined 07-12-88 0830

VOLATILE		ug/l
trans-1,2-Dichloroethene	<500.	ug/l
Tetrachloroethene	600.	ug/l
Toluene	7,850.	ug/l
1,1,1-Trichloroethane	5,450.	ug/l
Trichloroethene	750.	ug/l

Toni Gartner, Manager
Rockford Division

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

07-29-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Received: 07-12-88 1220

55413 Effluent 07-12-88 0830

VOLATILE		ug/l
trans-1,2-Dichloroethene	<1.0	ug/l
Tetrachloroethene	<1.0	ug/l
Toluene	<1.0	ug/l
1,1,1-Trichloroethane	1.8	ug/l
Trichloroethene	<1.0	ug/l

Todd Gartner, Manager
Rockford Division

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61103

09-06-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 08-17-88 1035

56074 Influent Well #1 08-17-88 0900

VOLATILE		ug/l
trans-1,2-Dichloroethene	<100.	ug/l
Tetrachloroethene	<100.	ug/l
Toluene	250.	ug/l
1,1,1-Trichloroethane	2,350.	ug/l
Trichloroethene	320.	ug/l

56075 Influent Well #2 08-17-88 0900

VOLATILE		ug/l
trans-1,2-Dichloroethene	<500.	ug/l
Tetrachloroethene	<500.	ug/l
Toluene	<500.	ug/l
1,1,1-Trichloroethane	2,850.	ug/l
Trichloroethene	<500.	ug/l

Tony Gartner, Manager
Rockford Division

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

09-06-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 08-17-88 1035

56076 Influent Well #3 08-17-88 0900

VOLATILE		ug/l
trans-1,2-Dichloroethene	<50.	ug/l
Tetrachloroethene	<50.	ug/l
Toluene	<50.	ug/l
1,1,1-Trichloroethane	210.	ug/l
Trichloroethene	<50.	ug/l

56077 Influent Combined 08-17-88 0900

VOLATILE		ug/l
trans-1,2-Dichloroethene	<100.	ug/l
Tetrachloroethene	160.	ug/l
Toluene	150.	ug/l
1,1,1-Trichloroethane	1,460.	ug/l
Trichloroethene	220.	ug/l

Toni Gartner, Manager
Rockford Division

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

09-06-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 08-17-88 1035

56078 Effluent 08-17-88 0900

VOLATILE		ug/l
trans-1,2-Dichloroethene	<1.0	ug/l
Tetrachloroethene	<1.0	ug/l
Toluene	<1.0	ug/l
1,1,1-Trichloroethane	2.5	ug/l
Trichloroethene	<1.0	ug/l

Toni Gartner, Manager
Rockford Division

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

11-04-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 10-18-88 1300

57518 Influent Well #1 10-18-88 1000

VOLATILE		ug/L
trans-1,2-Dichloroethene	<100.	ug/L
Tetrachloroethene	190.	ug/L
Toluene	<100.	ug/L
1,1,1-Trichloroethane	1,300.	ug/L
Trichloroethene	300.	ug/L

57519 Influent Well #2 10-18-88 1000

VOLATILE		ug/L
trans-1,2-Dichloroethene	<200.	ug/L
Tetrachloroethene	2,300.	ug/L
Toluene	21,000.	ug/L
1,1,1-Trichloroethane	11,000.	ug/L
Trichloroethene	2,800.	ug/L

Toni Gartner, Manager
Rockford Division

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

11-04-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 10-18-88 1300

57520 Influent Well #3 10-18-88 1000

VOLATILE		ug/L
trans-1,2-Dichloroethene	<25.	ug/L
Tetrachloroethene	<25.	ug/L
Toluene	<25.	ug/L
1,1,1-Trichloroethane	110.	ug/L
Trichloroethene	<25.	ug/L

57521 Influent Combined 10-18-88 1000

VOLATILE		ug/L
trans-1,2-Dichloroethene	<100.	ug/L
Tetrachloroethene	350.	ug/L
Toluene	5,000.	ug/L
1,1,1-Trichloroethane	2,000.	ug/L
Trichloroethene	480.	ug/L

Toni Gartner, Manager
Rockford Division

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

11-04-88

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 10-18-88 1300

57522 Effluent

10-18-88 1000

VOLATILE		ug/L
trans-1,2-Dichloroethene	<1.0	ug/L
Tetrachloroethene	<1.0	ug/L
Toluene	<1.0	ug/L
1,1,1-Trichloroethane	<1.0	ug/L
Trichloroethene	<1.0	ug/L

Toni Gartner, Manager
Rockford Division

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

01-06-89

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 12-13-88

58982 Influent Well #1 12-13-88 1000

VOLATILE		ug/L
trans-1,2-Dichloroethene	<10.	ug/L
Tetrachloroethene	220.	ug/L
Toluene	<10.	ug/L
1,1,1-Trichloroethane	2,000.	ug/L
Trichloroethene	240.	ug/L

58983 Influent Well #2 12-13-88 1000

VOLATILE		
trans-1,2-Dichloroethene	<100.	ug/L
Tetrachloroethene	120.	ug/L
Toluene	130.	ug/L
1,1,1-Trichloroethane	<100.	ug/L
Trichloroethene	120.	ug/L

Toni Gartner, Manager
Rockford Division

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

01-06-89

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 12-13-88

58984 Influent Well #3 12-13-88 1000

	VOLATILE	
trans-1,2-Dichloroethene	<1.0	ug/L
Tetrachloroethene	13.	ug/L
Toluene	<1.0	ug/L
1,1,1-Trichloroethane	87.	ug/L
Trichloroethene	12.	ug/L

58985 Influent Well Combined 12-13-88 1000

	VOLATILE	
trans-1,2-Dichloroethene	<100.	ug/L
Tetrachloroethene	<100.	ug/L
Toluene	<100.	ug/L
1,1,1-Trichloroethane	630.	ug/L
Trichloroethene	<100.	ug/L

Toni Gartner, Manager
Rockford Division

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

Formerly: Aqualab, Inc.

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

01-06-89

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 12-13-88

58986 Effluent 12-13-88 1000

VOLATILE		
trans-1,2-Dichloroethene	<1.0	ug/L
Tetrachloroethene	<1.0	ug/L
Toluene	<1.0	ug/L
1,1,1-Trichloroethane	1.1	ug/L
Trichloroethene	<1.0	ug/L

Toni Gartner, Manager
Rockford Division

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

02-14-89

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 01-26-89

59977 Influent Well #1 01-26-89 0900

	VOLATILE	
trans-1,2-Dichloroethene	<100.	ug/L
Tetrachloroethene	210.	ug/L
Toluene	180.	ug/L
1,1,1-Trichloroethane	2,360.	ug/L
Trichloroethene	250.	ug/L

59978 Influent Well #2 01-26-89 0900

	VOLATILE	
trans-1,2-Dichloroethene	<200.	ug/L
Tetrachloroethene	220.	ug/L
Toluene	<200.	ug/L
1,1,1-Trichloroethane	3,020.	ug/L
Trichloroethene	<200.	ug/L

Toni Gartner, Manager
Rockford Division

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

02-14-89

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 01-26-89

59979 Influent Well #3 01-26-89 0900

	VOLATILE	
trans-1,2-Dichloroethene	<25.	ug/L
Tetrachloroethene	28.	ug/L
Toluene	<25.	ug/L
1,1,1-Trichloroethane	280.	ug/L
Trichloroethene	<25.	ug/L

59980 Influent Combined 01-26-89 0900

	VOLATILE	
trans-1,2-Dichloroethene	<100.	ug/L
Tetrachloroethene	150.	ug/L
Toluene	<100.	ug/L
1,1,1-Trichloroethane	1,700.	ug/L
Trichloroethene	180.	ug/L

Tom Gartner, Manager
Rockford Division

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Rockford Division
3548 35th Street
Rockford, IL 61109
Tel: (815) 874-2171
Fax: (815) 874-5622

ANALYTICAL REPORT

Mr. Al Munn
SUNDSTRAND AVIATION
4747 Harrison Avenue
Rockford IL 61108

02-14-89

SAMPLE DESCRIPTION: Aqua Detox Tower Samples

Date Taken: SEE BELOW

Date Received: 01-26-89

59981 Effluent 01-26-89 0900

VOLATILE		
trans-1,2-Dichloroethene	<1.0	ug/L
Tetrachloroethene	<1.0	ug/L
Toluene	<1.0	ug/L
1,1,1-Trichloroethane	<1.0	ug/L
Trichloroethene	<1.0	ug/L

Toni Gartner, Manager
Rockford Division

ANALYTICAL SERVICES
EDI LABORATORY REPORT

CLIENT: SUNDSTRAND HEAT TRANSFER
PROJECT NO.: 25363
LOCATION: ROCKFORD, ILL.
SAMPLED BY: DON JOHNSON
DESCRIPTION: HYDROGEO EVALUATION

DATE SAMPLED: 00/00/00 TIME:
DATE RECEIVED: 03/20/89 TIME: 8:00 AM
DATE COMPLETED: 03/21/89
SCHEDULED COMPLETION: 03/24/89
ANALYST: LKS,WH
QUALITY CONTROL REVIEW BY: RVB
WORKSHEET NO: 2

	MW 10	MW 19	MW 20	MW 21	DETECTION LIMIT	UNITS
EDI SAMPLE NO:	15550	15551	15552	15553		
111-TRICHLOROETHANE	180	<1.0	4.9	20	1.0	ug/l
DATE SAMPLED:	03/16/89	03/16/89	03/16/89	03/16/89		
TIME SAMPLED:	9:40 AM	12:45 PM	12:35 PM	2:25 PM		

EDI Engineering & Science
Environmental Engineering, Geology, Biology and Chemistry
5555 Glenwood Hills Pkwy. SE, Grand Rapids, MI 49508, (616) 942-9600
a subsidiary of **WW Engineering & Science**

ANALYTICAL SERVICES
EDI LABORATORY REPORT

CLIENT: SUNDSTRAND HEAT TRANSFER
PROJECT NO.: 25363
LOCATION: ROCKFORD, ILL.
SAMPLED BY: DON JOHNSON
DESCRIPTION: HYDROGEO EVALUATION

DATE SAMPLED: 00/00/00 TIME:
DATE RECEIVED: 03/20/89 TIME: 8:00 AM
DATE COMPLETED: 03/21/89
SCHEDULED COMPLETION: 03/24/89
ANALYST: WH
QUALITY CONTROL REVIEW BY: RVB
WORKSHEET NO: 4

	MW 28 A	MW 29	MW 31	MW 31 A	DETECTION LIMIT	UNITS
EDI SAMPLE NO:	15554	15555	15556	15557		
111-TRICHLOROETHANE	26	1.7	18	57	1.0	ug/l
DATE SAMPLED:	03/16/89	03/16/89	03/15/89	03/15/89		
TIME SAMPLED:	1:45 PM	11:45 AM	6:15 PM	6:05 PM		

EDI Engineering & Science
Environmental Engineering, Geology, Biology and Chemistry
5555 Glenwood Hills Pkwy., SE Grand Rapids, MI 49508 (616) 942-9600
a subsidiary of **WW Engineering & Science**

ANALYTICAL SERVICES
EDI LABORATORY REPORT

CLIENT: SUNDSTRAND HEAT TRANSFER
PROJECT NO.: 25363
LOCATION: ROCKFORD, ILL.
SAMPLED BY: DON JOHNSON
DESCRIPTION: HYDROGEO EVALUATION

DATE SAMPLED: 00/00/00 TIME:
DATE RECEIVED: 03/20/89 TIME: 8:00 AM
DATE COMPLETED: 03/21/89
SCHEDULED COMPLETION: 03/24/89
ANALYST: WH
QUALITY CONTROL REVIEW BY: RVB
WORKSHEET NO: 9

	MW 32	DETECTION LIMIT	UNITS
EDI SAMPLE NO:	15558		
111-TRICHLOROETHANE	1,500	1.0	ug/l
DATE SAMPLED:	03/16/89		
TIME SAMPLED:	10:40 AM		

EDI Engineering & Science
Environmental Engineering, Geology, Biology and Chemistry
5555 Glenwood Hills Pkwy. SE, Grand Rapids, MI 49508, (616) 942-9600
a subsidiary of **WW Engineering & Science**

July 22, 1986

Mr. Al Munn
Sundstrand Corporation
P O Box 7003
4751 Harrison
Rockford, IL 61125

Dear Mr. Munn:

We have completed our initial investigation on the extent of volatile organic compounds in groundwater at your plant. The purpose of this investigation was to examine the geology of the plant site to help determine the pathways for contaminant migration and, secondarily, to evaluate the quality of groundwater. To accomplish this, we constructed four exploration/monitoring wells (wells 27, 28, 29 and 30), geophysically logged the new wells plus selected existing wells, measured water levels, collected water samples for chemical analysis, and compiled and reviewed available information on local hydrogeology. This letter report summarizes our findings.

Geology

The glacial sediments which underlie the plant site consist of poorly sorted material having a high clay content. No glacial strata was found which would yield large quantities of water, because, although texturally varied, they all contained some clay. These sediments have a low permeability, and hence, the rate of contaminant migration is not expected to be great.

Gravelly zones do exist in the glacial sediments. These zones provide the best avenues for contaminant migration. The general nature of the strata is illustrated by cross sections shown in Figures 1 and 2; Figure 3 shows the location of the cross sections.

The thickness of glacial sediments is highly variable on-site, ranging from 10 to 20 feet near the plant to 140 feet at the southwestern property corner.

The dolomite bedrock has low primary porosity, and hence, permeability, but where it is fractured, the permeability will be higher. In general, a fractured zone at the top of the dolomite is expected; however, none of the exploration holes constructed for this preliminary study encountered zones which were highly fractured.

The irregular surface of the bedrock is illustrated in Figure 4. The buried valleys found on the bedrock surface may influence the direction of contaminant movement, but this possibility cannot be proven or disproven at this point.

The area west of the plant is geologically different than the area near the plant. The ancestral Rock River carved a deep valley in the bedrock, removed the dolomite strata, and exposed the St. Peter Sandstone. Later, the river deposited sand and gravel in the valley. This relationship is illustrated conceptually by Figure 5 which was prepared by Stanley Consultants for the City of Rockford.

Both the sand and gravel found near the river and the St. Peter Sandstone are important aquifers in this region. Both aquifers are vulnerable to contamination near the river. The glacial sediments near the plant and the dolomite bedrock, both of which have low permeability, protect the St. Peter Sandstone from contamination.

Groundwater Flow

The water table is relatively shallow, ranging from less than 10 feet in areas south of the plant to almost 50 feet below ground. In some areas, where the glacial sediments are thin, the water table lies below the top of bedrock.

The flow pattern of groundwater in the glacial sediments is about the same as the flow pattern of groundwater in the bedrock. As shown in Figures 6 and 7, the direction of flow is southwestward in the northeastern portion of the property and westward along the western property line. However, the water level measurements in wells tapping the glacial sediments show a complex flow pattern suggesting poor hydraulic connections between various glacial strata.

The hydraulic gradient of groundwater in glacial sediments in an area south of the plant is very low. This may represent a zone where groundwater from the glacial sediments recharges the dolomite formation. This area is also where gravelly sediments are found in the basal part of the glacial sediments.

Groundwater in either the glacial sediments or the bedrock is expected to discharge to the Rock River (4 miles west) or be intercepted by municipal wells (2.5 miles west). The intermittent stream found west of the plant is not expected to be a significant discharge zone. This conclusion is based on the stream's elevation compared to local groundwater level contours. However, the shape of the water level contours at the western property line suggest that the stream may be a discharge zone. Figure 8 shows the relationship of the local streams and municipal wells to the plant.

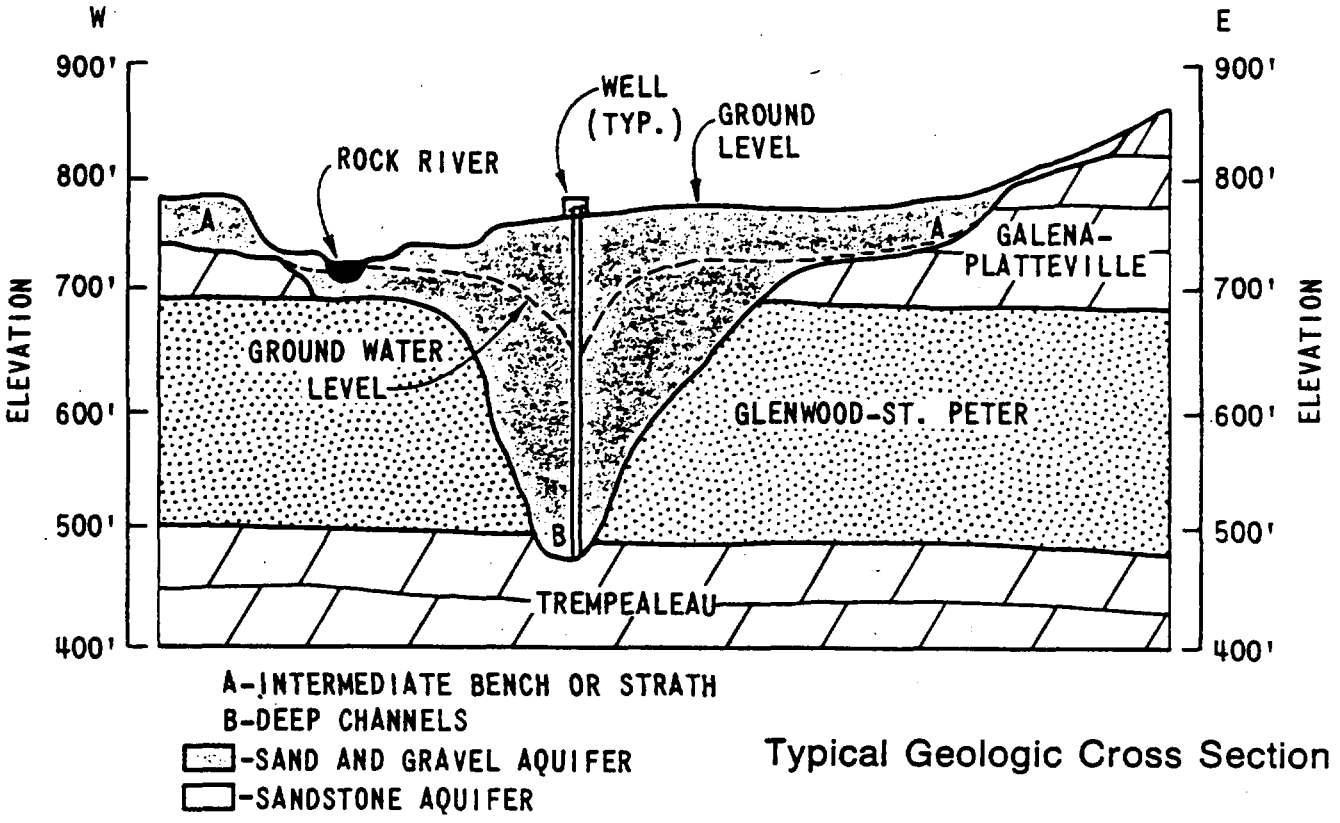


FIGURE 5.

TYPICAL GEOLOGIC CROSS SECTION
(Stanley Consultants, Inc., 1979)

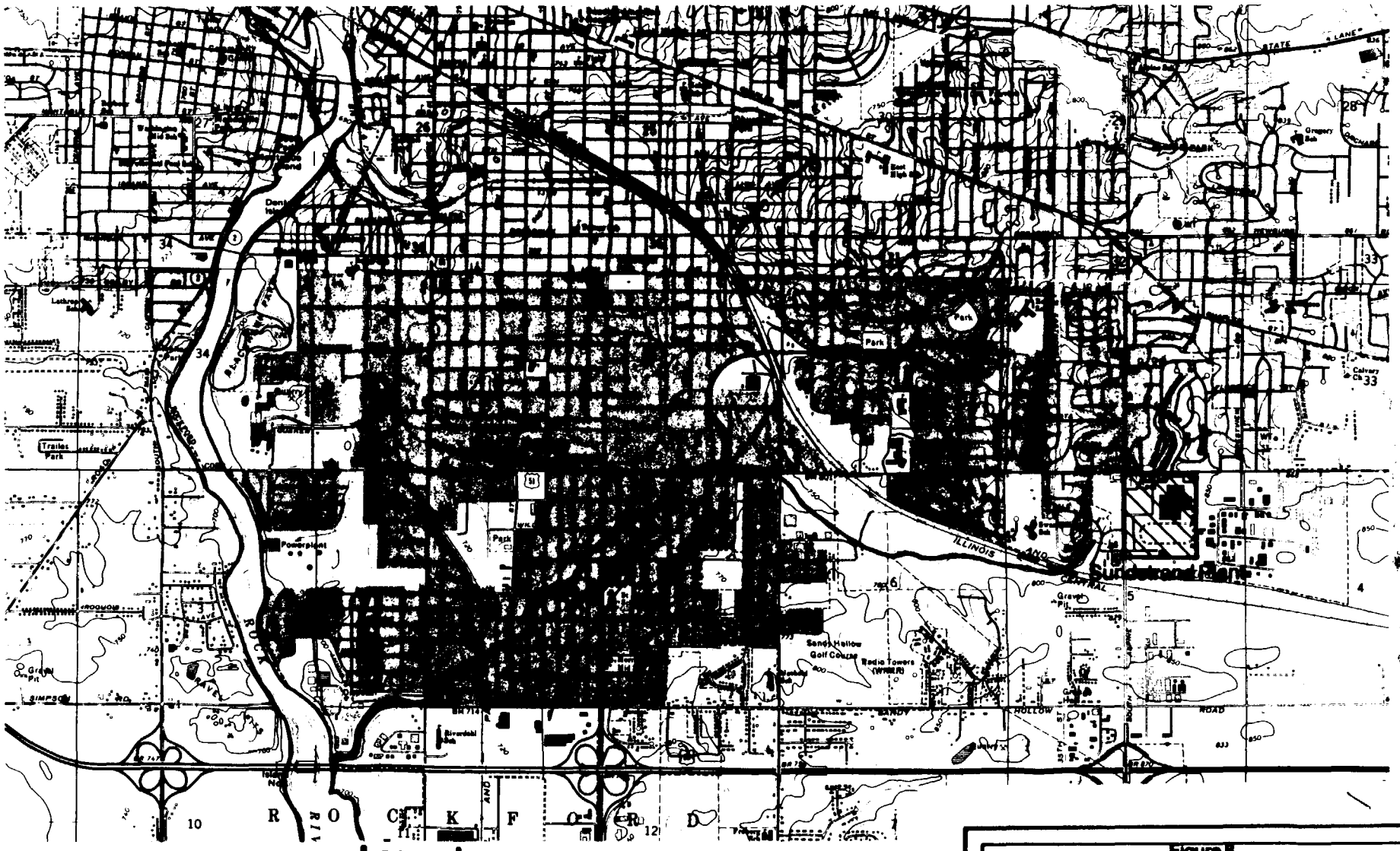


Figure 8

Relationships of Plant to Streams and Municipal Wells

Sundstrand Corporation
Rockford, Illinois

July, 1986

20567

Groundwater Quality

Groundwater having the highest volatile organic compound concentration seems to be restricted to the area south of the main plant and north of "Plant 8". The area extends westward from the toluene recovery facility, where VOC concentrations are highest, to the west property line. This area is shown in Figure 9. The distribution of contaminants shown in this figure is based on likely source areas, observed VOC concentration in groundwater, and the direction of groundwater flow.

The upper portion of the bedrock formation seems to be the zone through which the contaminants are migrating off-site. However, closer to the plant the contaminants are expected to be found mostly in the glacial sediment.

Copies of our recent chemical analyses are attached and Table 1 is a summary of the new analyses plus previous analyses.

We look forward to discussing our findings with you in more detail. If you have questions about this report or our work, please contact Dennis Gebben or me.

Respectfully,

EDI ENGINEERING & SCIENCE

David E. Swanson
Project Manager

DES/mck

Enclosures

Table 1

SUMMARY OF GROUNDWATER QUALITY

WELL NO	DEPTH DEPTH (ft)	FORMATION	BEDROCK DEPTH (ft)	COMPOUND AND CONCENTRATION (ug/L) TCA	TCE	PCE	DCE	OTHER
3	12	Drift						
2	43	Bedrock	23	0- 1,400	---	---	---	
5	65	Bedrock		690-11,300	0- 120	0-220	0- 830	
1	126	Bedrock		0- 8,900	37-2,490	0-400	0-1,700	
4A	38	Bedrock	25	---	---	---	---	
15	50	Bedrock	27	1,800- 3,800	---	---	106- 297	
23	64	Bedrock	25	---	---	---	---	
24	75	Bedrock	25	---	---	---	---	
25	140	Bedrock	---	---	---	---		
26	96			---	---	---	---	
6	38	Bedrock	13	270	29	98	45	
12	31	Bedrock	22	---	---	---	---	
13	66	Bedrock		---	---	---	---	Benzene: 2
14	101	Bedrock		---	---	---	---	
11	40	Drift		---	---	---	---	
10	87	Bedrock	77	2,100	160	140	330	TCFM: 4/DCA: 9/1,2-DCE: 9
16	201	Bedrock		---	---	---	---	Benzene: 1
8	19	Drift		15	---	---	---	
17	154	Bedrock	133	---	---	---	---	
28	107	Bedrock	91	---	---	---	---	
21	76	Drift		24	---	---	---	DCA: 9
22	146	Bedrock	137	---	---	---	---	
7	30	Drift		---	---	---	---	Benzene: 1
9	52	Bedrock	42		360	38	23	49 DCA: 2
18	151	Bedrock		---	---	---	---	
30	39	Bedrock	20	---	---	---	---	
19	40	Drift		---	---	---	---	Benzene: 2
29	113	Bedrock	100	---	---	---	---	Benzene: 1
20	147	Bedrock		2	---	---	---	Benzene: 1
27	83	Bedrock	69	---	---	---	---	

NOTE: Dashed line indicates the compound was not found or was present in concentrations below the analytical detection limit.

ATTACHMENT 1

CONSTRUCTION RECORDS FOR NEW WELLS